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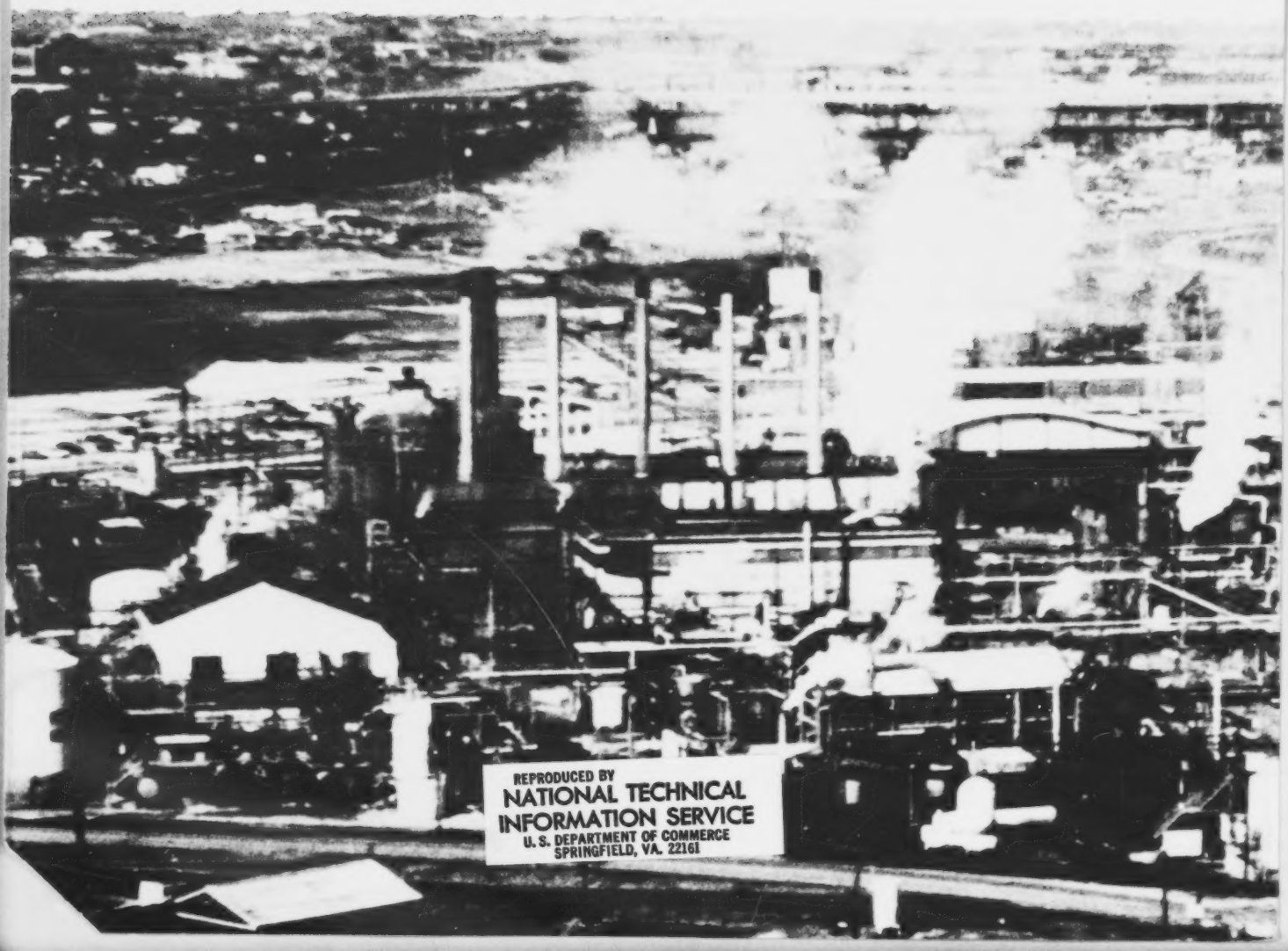

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16. ABSTRACT The information presented in this user's guide is directed to air pollution scientists having an interest in applying air quality simulation models. RAM is the three letter designation for this system of efficient Gaussian-plume multiple-source air quality algorithms and also the primary algorithm for urban areas. These algorithms can be used for estimating air quality concentrations of relatively nonreactive pollutants for averaging times from an hour to a day from point and area sources. The algorithms are applicable for locations with level or gently rolling terrain where a single wind vector for each hour is a good approximation to the flow over the source area considered. Calculations are performed for each hour. Computation time is kept to a minimum by the manner in which concentrations from area sources are estimated using a narrow plume hypothesis and using the area source squares as given rather than breaking down all sources into an area of uniform elements. Options are available to the user to allow use of three different types of receptor locations: (1) those whose coordinates are input by the user, (2) those whose coordinates are determined by the model and are downwind of significant point and area sources where maxima are likely to occur, and (3) those whose coordinates are determined by the model to give good area coverage of a specific portion of the region. Computation time is also decreased by keeping the number of receptors to a minimum. Volume II presents RAM example outputs, typical run streams, variable glossaries, and Fortran source codes.

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User's Guide For RAM
Volume II.
Data Preparation and Listings

by

D. Bruce Turner and Joan Hrenko Novak

Meteorology and Assessment Division
Environmental Sciences Research Laboratory

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AUTHORS' AFFILIATION

The authors are on assignment with the U. S. Environmental Protection Agency from the National Oceanic and Atmospheric Administration, U. S. Department of Commerce.

FOREWORD

Within the Office of Air, Land, and Water Use, the Environmental Sciences Research Laboratory conducts a research program in the physical sciences to detect, define, and quantify the effects of air pollution on urban, regional, and global atmospheres and the subsequent impact on water quality and land use. This includes research and development programs designed to quantitate the relationships between emissions of pollutants from all types of sources and air quality and atmospheric effects.

The Meteorology and Assessment Division conducts research programs in environmental meteorology to describe the roles and interrelationships of atmospheric processes and airborne pollutants in effective air, water, and land resource management. Developed air quality simulation models (in Fortran computer code) are made available to dispersion model users in computer compatible form by availabliity of a magnetic tape from NTIS (See Preface).

RAM is one of the five dispersion algorithms added to UNAMAP in March 1978. RAM is based upon Gaussian dispersion concepts of steady-state modeling. Limitations are imposed on use of the algorithm by the assumptions of non-reactive pollutants and one wind vector and one stability class as representative of the area being modeled. Also computations made under light wind conditions should be interpreted skeptically. In spite of these limitations RAM provides a useful short-term (hours to a day) algorithm for point and area sources for air pollution impact assessment.

L. E. Niemeyer, NOAA
Director, Meteorology and Assessment Division

PREFACE

One of the research activities of the Meteorology and Assessment Division focuses on the development, evaluation, validation, and application of air quality simulation, photochemical, and meteorological models capable of describing air quality and atmospheric processes affecting the disposition of airborne pollutants, on scales ranging from local to global. Within the Division, the Environmental Applications Branch adapts and evaluates new and existing meteorological dispersion models and statistical technique models, tailors effective models for recurring user application, and makes these models available through EPA's computer network system.

RAM, an adaptation of Gaussian techniques previously used in point source modeling, uses a rapid executing algorithm for area sources based on the narrow plume hypothesis and has numerous options available to increase user utility. RAM is one of the atmospheric dispersion models on the User's Network for Applied Modeling of Air Pollution (UNAMAP) system. The UNAMAP system may be purchased on magnetic tape from the National Technical Information Service (NTIS) for use on the user's computer system.

Although attempts are made to thoroughly check out computer programs with a wide variety of input data, errors are occasionally found. In case there is a need to correct, revise, or update this model, revisions may be obtained as they are issued by completing and sending the form on the last page of this guide.

Comments and suggestions regarding this publication should be directed to:

Chief, Environmental Applications Branch
Meteorology and Assessment Division (MD-80)
Environmental Protection Agency
RESRCH TRI PK, NC 27711

Technical questions regarding use of the model may be asked by calling (919) 541-4564. Users within the Federal Government may call FTS: 629-4564. Both volumes of the User's Guide are available from NTIS, Springfield, Va. 22161.

The magnetic tape containing all Fortran source codes for RAM, as well as for ten other dispersion models, may be ordered from Computer Products, NTIS. Ask for UNAMAP (Version 3), PB 277 193.

ABSTRACT

The information presented in this user's guide is directed to air pollution scientists having an interest in applying air quality simulation models. RAM is the three letter designation for this system of efficient Gaussian-plume multiple-source air quality algorithms and also the primary algorithm for urban areas. RAM is a method of estimating short-term dispersion using the Gaussian steady-state model. These algorithms can be used for estimating air quality concentrations of relatively non-reactive pollutants for averaging times from an hour to a day from point and area sources. The algorithms are applicable for locations with level or gently rolling terrain where a single wind vector for each hour is a good approximation to the flow over the source area considered. Calculations are performed for each hour. Hourly meteorological data required are wind direction, wind speed, temperature, stability class, and mixing height. Emission information required of point sources consists of source coordinates, emission rate, physical height, stack diameter, stack gas exit velocity, and stack gas temperature. Emission information required of area sources consists of south-west corner coordinates, source side length, total area emission rate and effective area source-height. Computation time is kept to a minimum by the manner in which concentrations from area sources are estimated using a narrow plume hypothesis and using the area source squares as given rather than breaking down all sources into an area of uniform elements. Options are available to the user to allow use of three different types of receptor locations: 1) those whose coordinates are input by the user, 2) those whose coordinates are determined by the model and are downwind of significant point and area sources where maxima are likely to occur, and 3) those whose coordinates are determined by the model to give good area coverage of a specific portion of the region. Computation time is also decreased by keeping the number of receptors to a minimum. Volume I considers the use and capabilities of RAM, its basis, the organization of the computer program, and data requirements. Volume II presents RAM example outputs, typical run streams, variable glossaries, and Fortran source codes.

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We appreciate the suggestions for changes received from the Regional Meteorologists and other contributors in EPA regions. These suggested changes arose from their experience in running provisional versions of RAM.

RAM bears the initials of Robert A. McCormick who directed the meteorology program of the Federal air pollution control effort from June 1958 until the time of his retirement in January 1973. His dedicated leadership, encouragement, advice, and counsel throughout this peirod are greatly appreciated.

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1. INTRODUCTION

The purpose of Volume II of the RAM User's Guide is to supply the user with technical information necessary to execute all programs in the RAM system. Detailed explanations of the preparation of input data are given as well as corresponding example outputs. Core, time, and page estimates are provided in several example run streams. The form of the run cards is as follows:

@RUN,priority/options runid/core,accnt,proj-id,run-time(min),pages/cards

A glossary contains the definition of all variables used in the RAM programs, and, for completeness, all unique routines in the RAM system are listed below. The following table indicates which routines are necessary for execution of specific programs in the RAM system:

RAMQ	RAMMET	RAM	RAMF	RAMR	RAMFR	CUMF	RAMBLK
RAMQ	RAMMET	RAM	RAMF	RAMR	RAMFR	CUMF	RAMBLK
BLKQU		ANGARC	ANGARC	ANGARC	ANGARC	GRAPH	JMHCZB
BLKQR		JMHPOL	JMHPOL	JMHPOL	JMHPOL	PROB	DBTRCB
		JMHARE	JMHARE	JMHARE	JMHARE	CALCOMP	PGSZ
		JMHPTU	JMHPTU	JMHPTR	JMHPTR	SOFTWARE	PGSYSZ
		JMH54U	JMH54U	JMH54R	JMH54R		BRSZ
		JMHCZU	JMHCZU	JMHCZR	JMHCZR		BRSYSZ
		DBTRCU	DBTRCU	DBTRCR	DBTRCR		
		JMHFIN	JMHFD	JMHFIN	JMHFD		
		JMHREC	BRSZ	JMHREC	PGSZ		
		JMHOUR	BRSYSZ	JMHOUR	PGSYSZ		
		JMHHON	BLOCK	JMHHON	BLOCKR		
		BRSZ		PGSZ			
		BRSYSZ		PGSYSZ			
		BLOCK		BLOCKR			

2. SYSTEM OVERVIEW AND GLOSSARY

Figures 1 and 2 for the RAM system illustrate that control cards and either point or area source emissions or both are required input to RAMQ -- the emissions preprocessor. The generated output file is required for all versions of RAM.

Control and possibly receptor and meteorological data are input into the RAM versions on cards. If the user chooses to input meteorological data on cards, then execution of the meteorological preprocessor, RAMMET, may be omitted; otherwise one year's hourly surface observations and corresponding mixing height data is required by RAMMET to prepare the necessary meteorological input file for the RAM versions.

Finally, in addition to the average emissions data from RAMQ, all RAM versions will accept hourly emissions data.

Output from RAM or RAMR consists of printed output and, if specified by the user, punch cards for contouring and hourly contributions from each source to each receptor. Output from RAMF or RAMFR consists of printed output and hourly and daily concentration files. The daily concentration file can be used as input to the program CUMF in order to produce printed and plotted cumulative frequency distributions.

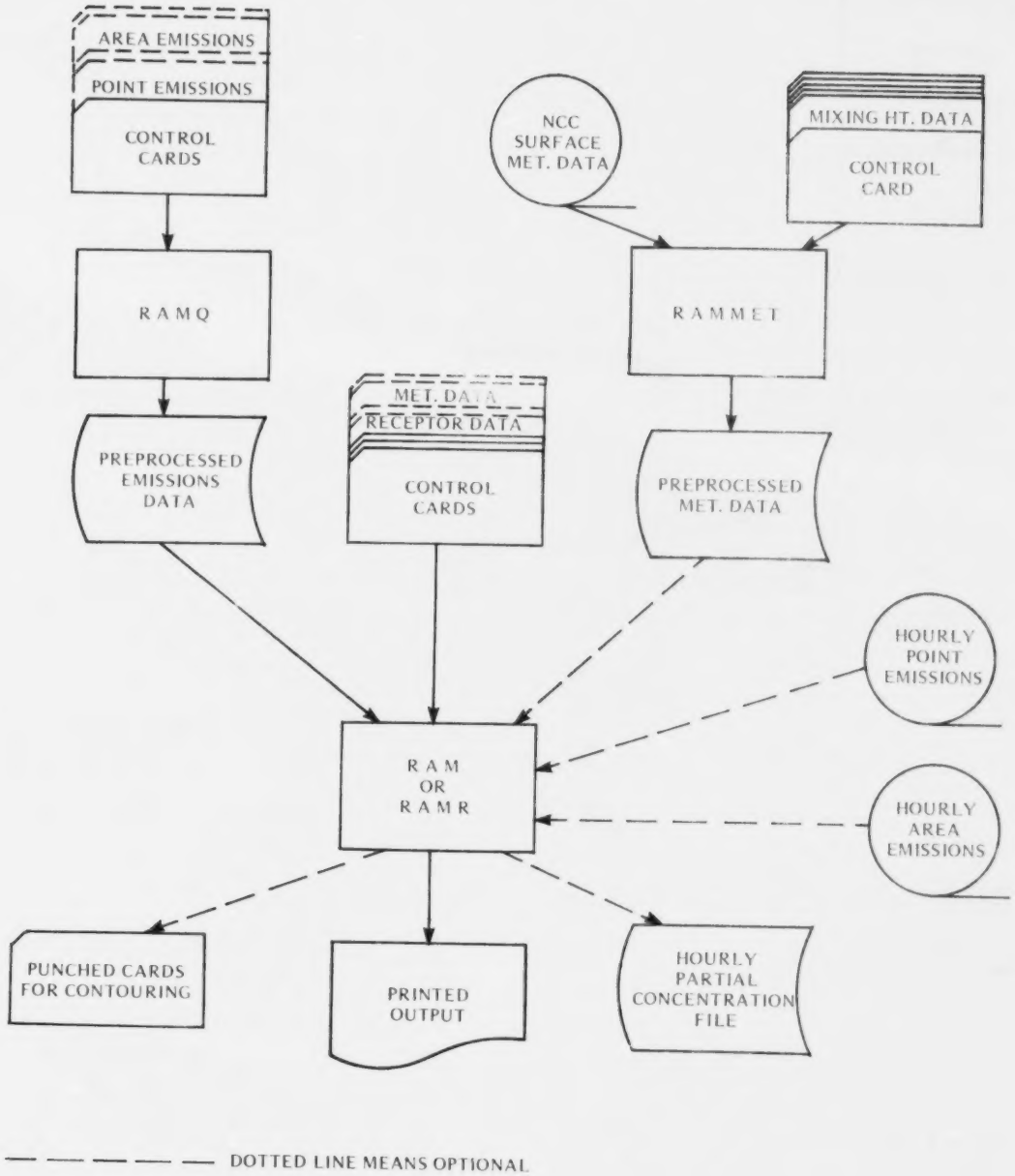

Figure 1. System flow for RAM or RAMR

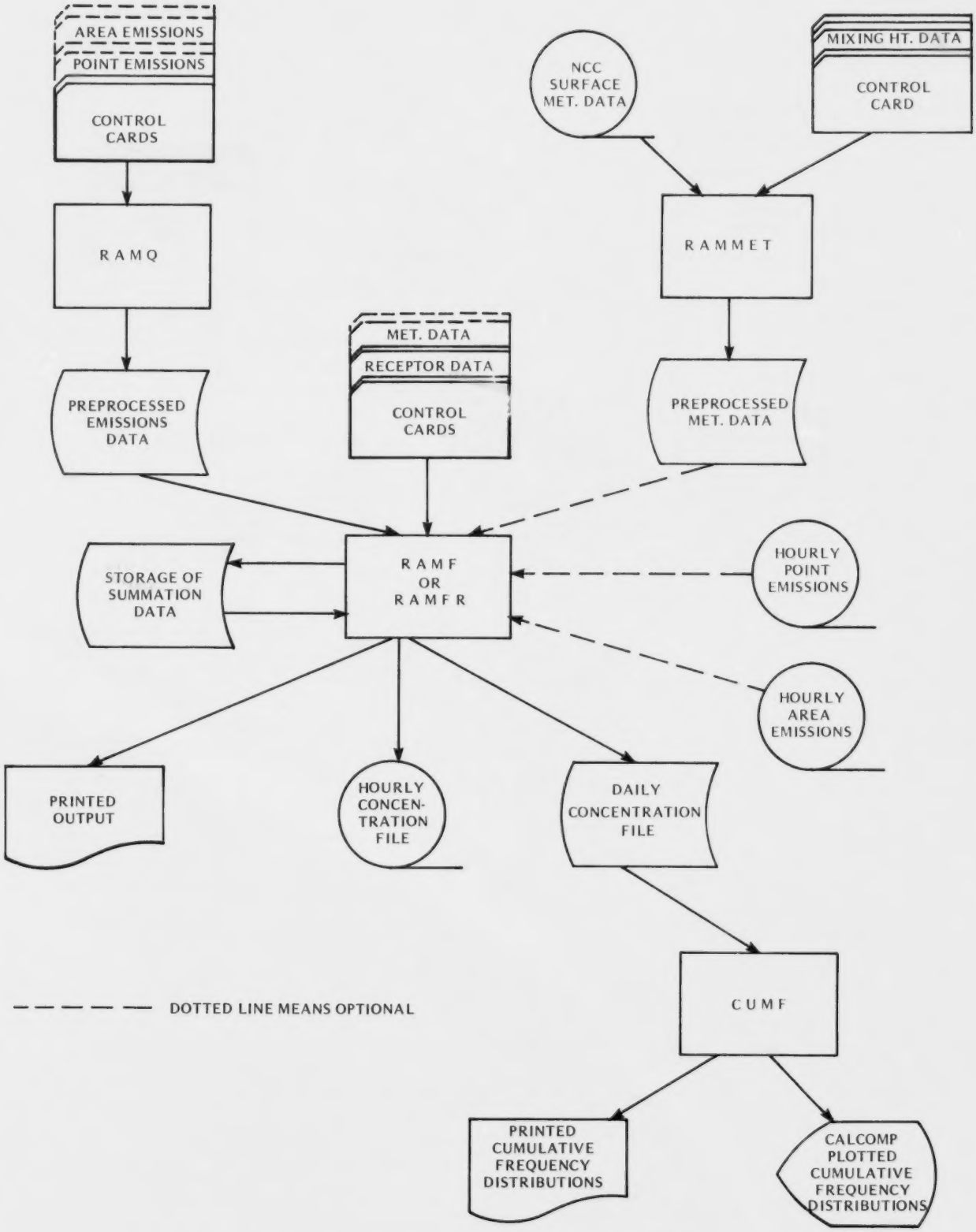

Figure 2. System flow for RAMF or RAMFR

```
                        VERSION 78124 OF RAM DOCUMENTATION
C     * * * G L O S S A R Y   O F   T E R M S   F O R   R A M  A N D  R A M R  *

C        RAM IS AN URBAN SHORT TERM STEADY-STATE GAUSSIAN DISPERSION MODEL THAT
C         DETERMINES HOURLY CONC. AND AVG. CONC. FOR NAVG HOURS AT A NUMBER OF
C         RECEPTOR POINTS . RAMR IS THE RURAL VERSION OF RAM.
C
C     ACHI      CONCENTRATION DUE TO AREA SOURCES AT EACH RECEPTOR(G/M**3)
C     AHCHI     SAME AS ACHI  BUT FOR THIS HOUR ONLY.
C     AHSIGS    SAME AS ASIGS BUT FOR THIS HOUR ONLY.
C     ANGARC    SUBROUTINE- DETERMINE THE ARCTAN(DELM/DELN)
C     ASIGS     PARTIAL CONC. DUE TO EACH SIGNIF. AREA  SOURCE AT EACH RECEPTOR
C     ASORC(1,NAS)  EAST COORD. OF SW CORNER OF AREA SOURCE (USER UNITS)
C     ASORC(2,NAS)  NORTH COORD. OF SW CORNER OF AREA SOURCE (USER UNITS)
C     ASORC(3,NAS)  SULFUR DIOXIDE EMISSION RATE FOR ENTIRE AREA (GRAMS/SECOND)
C     ASORC(4,NAS)  PARTICULATE    EMISSION RATE FOR ENTIRE AREA (GRAMS/SECOND)
C     ASORC(5,NAS)  SIDE LENGTH OF AREA SOURCE (USER UNITS)
C     ASORC(6,NAS)  AREA SOURCE HEIGHT (METERS)
C     AXCOF     AREA SOURCE DISTANCE COEFFICIENTS FROM RAMBLK
C     AXEXP     AREA SOURCE DISTANCE EXPONENTS FROM RAMBLK
C     BPH       HEIGHTS SEPARATING AREA HEIGHT CLASSES(METERS)
C     CIN       ARRAY CONTAINING INTEGRATED VALUES FOR AREA SOURCES
C     COEFFS    NAMED COMMON FOR COEFFICIENTS GENERATED BY RAMBLK
C     CONONE     MULTIPLIER CONSTANT TO CONVERT LENGTH IN USER UNITS TO KM
C     CONTWO     MULTIPLIER CONSTANT TO CONVERT LENGTH IN INTERNAL UNITS TO KM
C     COST      COSINE OF WIND DIRECTION FOR THIS HOUR
C     C1        DUMMY VARIABLE FREQUENTLY USED IN PRINTING
C     C2        DUMMY VARIABLE FREQUENTLY USED IN PRINTING
C     C3        DUMMY VARIABLE FREQUENTLY USED IN PRINTING
C     C4        DUMMY VARIABLE FREQUENTLY USED IN PRINTING
C     DAY1      JULIAN DAY OF MET DATA.
C     DEG       DEGREES FOR DETERMINATION OF QUADRANT
C     DELM      EAST  COMPONENT OF RESULTANT WIND FOR NAVG HOURS.
C     DELN      NORTH COMPONENT OF RESULTANT WIND FOR NAVG HOURS.
C     DSAV      ARRAY OF DISTANCES TO FINAL RISE(KM)
C     DUMR      DUMMY VARIABLE TO SKIP PAST WIND DIRECTION TO 10 DEGREES.
C     FH        FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGHT
C     GRIDSP    DISTANCE BETWEEN RECEPTORS GENERATED BY JMHHON (USER UNITS)
C     HAFL      POLLUTANT HALF-LIFE (SECONDS)
C     HCGRID    NAMED COMMON CONTAINING BOUNDS FOR HONEYCOMB GRID
C     HC1       HEIGHT CLASS DESIGNATIONS FOR RAMBLK DATA
C     HEIGHT    NAMED COMMON , VARIABLES CONCERNED WITH AREA SOURCE HEIGHTS
C     HINT      REPRESENTATIVE HEIGHTS FOR AREA SOURCES(METERS)
C     HL        MIXING HEIGHT(METERS) FOR THIS HOUR
C     HLH       MIXING HEIGHTS (METERS) FOR 24 HOURS
C     HRMIN,HRMAX,HSMIN,HSMAX LIMITS FOR HONEYCOMB RECEPTOR GENERATION-USER UNIT
C     HSAV      ARRAY OF PLUME RISES ALREADY CALCULATED(METERS)
C     I         DUMMY VARIABLE FREQUENTLY USED
C     IA        AREA SOURCE MAP ARRAY (CONTAINS INTEGER MAPPING OF AREA
C                SOURCES BY SOURCE NUMBER).
C     IASIGS    ARRAY CONTAINING RANK FOR EACH AREA SOURCE IN TERMS OF
C               SIGNIFICANCE
C     ICHAR     AN 'I' TO INDICATE INPUT RECEPTOR.
```

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C      ICODE    NUMBER OF SIGNIFICANT SOURCE WHICH GENERATED THIS RECEPTOR
C      ID       SURFACE METEOROLOGICAL STATION IDENTIFICATION FROM DISK
C      IDATE    YEAR AND STARTING JULIAN DAY TO APPEAR ON OUTPUT.
C      IDATA    DATE(YYDDDHH) ON HOURLY AREA SOURCE EMISSION RECORD
C      IDATP    DATE(YYDDDHH) ON HOURLY POINT SOURCE EMISSION RECORD
C      IDAY     NUMBER OF DAYS PREVIOUSLY PROCESSED BY A PRECEDING RUN.
C      IDCK     INTERNAL DATE USED FOR CHECKING DATE ON HOURLY EMISSION
C      IHSTRT   START HOUR OF RUN
C      IDM      IDENTIFICATION FOR RADIOSONDE STATION USED TO DETERMINE
C                MIXING HEIGHT FROM DISK
C      IFREQ    FREQUENCY TABLE OF OCCURRENCE OF EACH STABILITY CLASS.
C      IKST     STABILITY CLASS FOR THIS HOUR
C      ILH      DO LOOP INDEX ON HOUR LOOP
C      IMAS     ARRAY OF ORIGINAL AREA SOURCE NUMBERS IN ORDER OF SIGNIFICANCE
C      IMO      MONTH ON MET DATA.
C      IMOD     INDICATOR FOR RURAL=1, OR URBAN=2 VERSION OF MODEL
C      IMPS     ARRAY OF ORIGINAL POINT SOURCE NUMBERS IN ORDER OF SIGNIFICANCE
C      IMXD     IDENTIFICATION FOR RADIOSONDE STATION USED TO DETERMINE
C                MIXING HEIGHT. FROM CARD INPUT.
C      IMXYR    YEAR FOR MIXING HEIGHT DATA - 2 DIGITS FROM CARD INPUT.
C      IN       INPUT UNIT NUMBER, CARD READER
C      INAS     THE NUMBER OF USER SPECIFIED SIGNIF. AREA SOURCES, COUNT
C      INPT     THE NUMBER OF USER SPECIFIED SIGNIF. POINT SOURCES, COUNT
C      IO       UNIT NUMBER(6) - PRINTER OUTPUT
C      IOPT(1)  CONTROL OPTION, POINT SOURCE INPUT?                0 = NO, 1 = YES.
C      IOPT(2)  CONTROL OPTION, AREA SOURCE INPUT?                 0 = NO, 1 = YES.
C      IOPT(3)  CONTROL OPTION, SPECIFIED RECEPTORS?               0 = NO, 1 = YES.
C      IOPT(4)  CONTROL OPTION, SIGNIFICANT POINT RECEPTORS?       0 = NO, 1 = YES.
C      IOPT(5)  CONTROL OPTION, SIGNIFICANT AREA  RECEPTORS?       0 = NO, 1 = YES.
C      IOPT(6)  CONTROL OPTION, FILL IN HONEYCOMB RECEPTORS?       0 = NO, 1 = YES.
C      IOPT(7)  CONTROL OPTION, HOURLY OUTPUT?                     0 = NO, 1 = YES.
C      IOPT(8)  CONTROL OPTION, SOURCE CONTRIBUTIONS TO DISK?      0 = NO, 1 = YES.
C      IOPT(9)  CONTROL OPTION, HOURLY SUMMARIES ONLY?             0 = NO, 1 = YES.
C      IOPT(10) CONTROL OPTION, PUNCH CARDS FOR CONTOURS?          0 = NO, 1 = YES.
C      IOPT(11) CONTROL OPTION, INPUT MET DATA ON CARDS?           0 = NO, 1 = YES.
C      IOPT(12) CONTROL OPTION, SPECIFY SIGNIF. SOURCE NUMBERS?    0 = NO, 1 = YES.
C      IOPT(13) CONTROL OPTION, READ HOURLY EMISSIONS?             0 = NO, 1 = YES.
C      IP       DUMMY VARIABLE USED FOR PROPER POLLUTANT TITLE
C      IPOL     INDEX FOR POLLUTANT, 3 = SO2 , 4 = PARTICULATE.
C      IPSIGS   ARRAY CONTAINING RANK FOR EACH POINT SOURCE IN TERMS OF
C                SIGNIFICANCE
C      IP1      DUMMY VARIABLE USED FOR LOOP BOUNDS
C      IQ       LOOP INDEX FOR MET DATA
C      IRSIZE   EAST-WEST SIZE OF AREA SOURCE REGION (IN INTERNAL UNITS).
C      ISFCD    SURFACE METEOROLOGICAL STATION IDENTIFICATION - FROM
C                CARD INPUT.
C      ISFCYR   YEAR FOR SURFACE DATA - 2 DIGITS. FROM CARD INPUT.
C      ISSIZE   NORTH-SOUTH SIZE OF AREA SOURCE REGION(IN INTERNAL UNITS)
C      ISTDAY   START DAY OF CURRENT AVERAGING PERIOD
C      ITYPE    ALPHANUMERIC CHARACTER TO INDICATE HOW A RECEPTOR IS GENERATED.
C      IWD      WIND DIRECTION CONTROL, QUADRANT FROM WHICH WIND BLOWS.
C      IYEAR    YEAR FOR SURFACE DATA - 2 DIGITS. FROM DISK.
C      IYM      YEAR FOR MIXING HEIGHT DATA - 2 DIGITS FROM DISK.
C      J        DUMMY VARIABLE FREQUENTLY USED
C      JDUM     DUMMY VARIABLE USED IN PRINTING AREA ARRAY MAP(IA)
C      JHR      HOUR SUBSCRIPT USED WITH MET DATA
C      JLIM     DUMMY VARIABLE USED IN PRINTING AREA ARRAY MAP(IA)
C      JMHARE   SUBROUTINE- INTEGRATES FOR CONC. FROM AREA SOURCES
C      JMHFIN   SUBROUTINE- PRODUCES OUTPUT FOR THE BASIC AVG. TIME
C      JMHHON   SUBROUTINE- GENERATES HONEYCOMB PATTERN OF RECEPTORS
C      JMHOUR   SUBROUTINE- PRODUCES HOURLY OUTPUT
C      JMHPTU   SUBROUTINE- DETERMINES CONC FROM POINT SOURCES
```

```
C               (JMHPTR IN RURAL VERSION)
C      JMHREC   SUBROUTINE- GENERATES RECEPTORS DOWNWIND OF SIGNIF. SOURCES
C      JMH54U   SUBROUTINE-GENERATES TABLES OF CALCULATED CONC. FOR AREA SOURCES
C               (JMH54R IN RURAL VERSION)
C      JYR      YEAR OF MET DATA.
C      K        DUMMY VARIABLE FREQUENTLY USED
C      KST      STABILITY CLASS FOR THIS HOUR.
C      KSUM     VARIABLE USED IN DETERMINING AVERAGE  STABILITY
C      L        DUMMY VARIABLE USED IN PRINTING POINT IDENTIFICATION
C      LH       INDEX USED FOR SUBSCRIPTING DATA IN HOUR LOOP
C      LINE1    FIRST LINE OF TITLE USUALLY IDENTIFIES USER AND
C                AFFILIATION.
C      LINE2    SECOND LINE OF TITLE, CAN IDENTIFY EMISSIONS SOURCE AND
C                DATE.
C      LINE3    THIRD LINE OF TITLE, CAN INDICATE METEOROLOGICAL DATA
C                LOCATION AND PERIOD OF RECORD.
C      LSMAX    MAXIMUM STABILITY CLASS FREQUENCY.
C      LST      VARIABLE USED IN DETERMINING MODAL STABILITY
C      LSTAB    VARIABLE USED IN DETERMINING MODAL STABILITY
C      MAS      AREA SOURCE NUMBERS USER WANTS TO CONSIDER AS SIGNIFICANT
C      METCON   NAMED COMMON,   CONC. ARRAYS AND CURRENT MET. CONDITIONS
C      METDAT   NAMED COMMON,  HOURLY MET. DATA FOR EACH DAY.
C      MODEL    MODEL(1) = 'RURAL'; MODEL(2) = 'URBAN'.
C      MODL     MODL=1 FOR RURAL VERSION, MODL=2 FOR URBAN VERSION
C      MPS      POINT SOURCE NUMBERS USER WANTS TO CONSIDER AS SIGNIFICANT
C      NAS      NUMBER OF AREA SOURCES,  COUNT
C      NAVG     NUMBER OF HOURS IN THE AVERAGING TIME
C      NB       THE BEGINNING HOUR OF THE CURRENT AVERAGING TIME LOOP
C      NBP      NUMBER OF HEIGHTS SEPARATING HEIGHT CLASSES
C      NE       THE ENDING HOUR OF THE CURRENT LOOP
C      NHRS     COUNT ; USED TO DETERMINE WHEN A DAY(24 HOURS) IS COMPLETE
C      NHTS     NUMBER OF HEIGHT CLASSES
C      NID      UNIT NUMBER(9) - DISK UNIT OF EMISSION DATA AND OTHER
C                INFORMATION FROM RAMQ.
C      NIP      UNIT NUMBER(10) - DISK OUTPUT OF PARTIAL CONCENTRATIONS AT
C                EACH RECEPTOR.
C      NIT      UNIT NUMBER(11) FOR INPUT OF MET DATA.
C      NP       CURRENT NUMBER OF COMPLETED PERIODS
C      NPER     THE NUMBER OF PERIODS TO BE RUN.
C      NPREC    NUMBER OF PERMANENT RECEPTORS
C      NPT      NUMBER OF POINT SOURCES, COUNT
C      NRECEP   TOTAL NUMBER OF RECEPTORS
C      NSIGA    NO. OF SIGNIFICANT AREA  SOURCES,MAY BE LESS THAN IN RAMQ
C      NSIGP    NO. OF SIGNIFICANT POINT SOURCES,MAY BE LESS THAN IN RAMQ
C      PARTC    ARRAY OF PARTIAL CONCENTRATIONS,CONTRIBUTION FROM EACH SOURCE
C      PCHI     CONCENTRATION DUE TO POINT SOURCES AT EACH RECEPTOR(G/M**3)
C      PERSIS   WIND PERSISTENCE FOR NAVG HOURS. (RESULTANT SPEED/AVG. SPEED)
C      PHCHI    SAME AS PCHI  BUT FOR THIS HOUR ONLY.
C      PHSIGS   SAME AS PSIGS BUT FOR THIS HOUR ONLY.
C      PL       ARRAY CONTAINING EXPONENTS FOR WIND PROFILE
C      PNAME    12 CHARACTER POINT SOURCE IDENTIFICATION.
C      PSAV     ORIGINAL ANNUAL EMISSION RATE FOR ALL SOURCES.
C      PSIGS    PARTIAL CONC. DUE TO EACH SIGNIF. POINT SOURCE AT EACH RECEPTOR.
C      PXCOF    POINT SOURCE DISTANCE COEFFICIENTS FROM RAMBLK
C      PXEXP    POINT SOURCE DISTANCE EXPONENTS FROM RAMBLK
C      PXUCOF   POINT SOURCE CONCENTRATION COEFFICIENTS FROM RAMBLK
C      PXUEXP   POINT SOURCE CONCENTRATION EXPONENTS FROM RAMBLK
C      QHL      ARRAY OF HOURLY MIXING HEIGHTS(METERS).
C      QTEMP    ARRAY OF AMBIENT AIR TEMPERATURES(KELVIN)
C      QTHETA   ARRAY OF WIND DIRECTIONS (DEGREES)
C      QU       ARRAY OF WIND SPEEDS (METERS/SECOND)
C      RDUM     INTERMEDIATE STORAGE
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C      RELC      NAMED COMMON FOR RELATIVE CONCENTRATION ARRAY.
C      RMAX      MAXIMUM EAST COORD. OF AREA SOURCES.(INTERNAL UNITS)
C      RMIN      MINIMUM EAST COORD. OF AREA SOURCES.(INTERNAL UNITS)
C      RMINI     MINIMUM EAST COORDINATE OF AREA SOURCES
C      RNAME     8 DIGIT ALPHANUMERIC DESCRIPTOR OF RECEPTOR.
C      RREC      EAST RECEPTOR CO-ORDINATES(USER UNIT CONVERTED TO INTERNAL UNIT)
C      SDUM      INTERMEDIATE STORAGE
C      SF        SIDE LENGTH OF AREA SOURCE IN METERS.
C      SINT      SIN OF WIND DIRECTION FOR THIS HOUR
C      SMAX      MAXIMUM NORTH COORD. OF AREA SOURCES.(INTERNAL UNITS)
C      SMIN      MINIMUM NORTH COORD. OF AREA SOURCES.(INTERNAL UNITS)
C      SMINI     MINIMUM NORTH COORDINATE OF AREA SOURCES
C      SORC      NAMED COMMON CONTAINING SOURCE AND CONTROL INFORMATION
C      SOURCE(1,NPT)  EAST  COORDINATE OF POINT SOURCE (USER UNITS)
C      SOURCE(2,NPT)  NORTH COORDINATE OF POINT SOURCE (USER UNITS)
C      SOURCE(3,NPT)  SULFUR DIOXIDE EMISSION RATE (GRAMS/SECOND)
C      SOURCE(4,NPT)  PARTICULATE EMISSION RATE (GRAMS/SECOND)
C      SOURCE(5,NPT)  PHYSICAL STACK HEIGHT (METERS)
C      SOURCE(6,NPT)  STACK GAS TEMPERATURE (KELVIN)
C      SOURCE(7,NPT)  STACK INSIDE TOP DIAMETER (METERS)
C      SOURCE(8,NPT)  STACK GAS EXIT VELOCITY (METERS/SECOND)
C      SOURCE(9,NPT)  BRIGGS F WITHOUT TEMP, THAT IS: 3.12139*VF
C      SREC      NORTH RECEPTOR COORDINATES(USER UNIT CONVERTED TO INTERNAL UNIT)
C      TEMP      AVERAGE AMBIENT AIR TEMPERATURE FOR NAVG HOURS. ALSO
C                 TEMPERATURE FOR THIS HOUR(KELVIN)
C      THETA     RESULTANT WIND DIRECTION FOR NHOURS(DEGREES).ALSO WIND
C                 DIRECTION FOR THIS HOUR
C      TITLE     TITLE(1)=' SO2  ', TITLE(2)=' PART '
C      TLOS      PARTIAL COMPUTATION RELATED TO POLLUTANT LOSS.
C      TRAD      ANGLE OF THE WIND THIS HOUR IN RADIANS.
C      U         AVERAGE WIND SPEED. ALSO WIND SPEED FOR THIS HOUR(METERS/SEC)
C      UNITS     NUMBER OF USER UNITS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH
C      UR        EAST COMPONENT OF THE WIND FOR THIS HOUR.(METERS/SEC)
C      URES      RESULTANT WIND SPEED(METERS/SEC)
C      URREC     EAST RECEPTOR COORDINATES IN USER UNITS
C      USREC     NORTH RECEPTOR COORDINATES IN USER UNITS
C      VR        NORTH COMPONENT OF THE WIND FOR THIS HOUR.(METERS/SEC)
C      XLIM      DISTANCE LIMIT ON INTEGRATION FOR AREA SOURCES(USER UNITS,
C                 CONVERTED TO KILOMETERS)
C      Z         RECEPTOR HEIGHT(METERS)


C      * * * G L O S S A R Y  O F  T E R M S  F O R  R A M F * * *
C                  * * * A N D   F O R   R A M F R * * *

C  RAMF CALCULATES CONCENTRATIONS FOR A YEAR. ALL RECEPTOR LOCATIONS
C   MUST BE READ AS INPUT; NONE CAN BE GENERATED. 24-HOUR CONCENTRATIONS
C   ARE PRINTED AND PUT ON DISK. HOURLY CONCENTRATIONS ARE WRITTEN ON
C   MAGNETIC TAPE. RAMFR IS THE RURAL VERSION OF RAMF.
C              FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C               IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C
C     ANMEAN    MEAN CONCENTRATION FOR THE NUMBER OF DAYS RUN
C     ANNSUM    THE RUNNING CONCENTRATION SUM AT EACH RECEPTOR
C     DMAX      FIVE HIGHEST DAILY CONCENTRATIONS AND JULIAN DATE OF OCCURRENCE
C     GRANDS    DAILY CONCENTRATION ARRAY
C     IDAYS     DATE OF LAST DAY PROCESSED AND WRITTEN TO SUMMARY INFO FILE
C     IJ        SUBSCRIPT USED IN INSERTING A NEW MAX. CONC. IN THE PROPER
C               POSITION IN THE HMAX ARRAY
C     IJP1      SAME AS IJ
C     IP1       DUMMY VARIABLE USED IN DETERMINING MODAL STABILITY
C     ISKIP     NUMBER OF RECORDS T  B  SKIPP
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C     JMHFD     SUBROUTINE- PRODUCES OUTPUT FOR THE BASIC AVG. TIME
C     LDRUN     DAY NUMBER OF LAST DAY TO BE PROCESSED IN THIS RUN
C     NDAYS     NUMBER OF DAYS TO BE RUN
C     SUM       NAMED COMMON CONTAINING SUMMARY ARRAYS
C     HMAX      FIVE HIGHEST HOURLY CONCENTRATIONS, DATE AND HOUR OF
C               OCCURRENCE FOR EACH RECEPTOR
C               HMAX(1,J,K) CONCENTRATION
C               HMAX(2,J,K) JULIAN DAY
C               HMAX(3,J,K) HOUR
C                 J IS THE FIRST THRU FIFTH HIGHEST INDICATOR
C                 K IS THE RECEPTOR NUMBER

C     * * * G L O S S A R Y   O F   T E R M S   F O R   R A M M E T * * *

C  RAMMET READS SURFACE OBSERVATION HOURLY CARD IMAGES FROM THE NATIONAL
C   CLIMATIC CENTER (NCC) FOR ONE YEAR'S DATA, READS MIXING HEIGHT
C   INFORMATION FROM CARDS,  CALCULATES STABILITY CLASS AND
C   RANDOMIZED  FLOW VECTOR, AND WRITES HOURLY MET. DATA ARRAYS
C   IN DAILY RECORDS.
C     AFV       FLOW VECTOR (ARRAY)
C     ALAT      LATITUDE OF SITE
C     ALF       SOLAR ELEVATION ANGLE(DEGREES)
C     ALFSIN    SINE OF SOLAR ELEVATION ANGLE
C     ALONG     LONGIDUTE OF SITE
C     AMM       TIME OF MERIDIAN PASSAGE
C     ANGL      TEST ELEVATION ANGLES
C     CONST     THE NUMBER OF DEGREES IN A RADIAN
C     COSD      COS OF DAYNO
C     COSLAT    COSINE OF LATITUDE
C     COSTD     COS OF TDAYNO
C     DAY1      JULIAN DAY OF MET DATA.
C     DAYNO     ANGULAR POSITION FOR THIS DAY.
C     DCOS      COSINE OF SOLAR DECLINATION
C     DSIN      SINE OF SOLAR DECLINATION
C     DUM       DUMMY VARIABLE FOR TEMPORARY STORAGE
C     FV        FLOW VECTOR (DEGREES)
C     FVR       RANDOMIZED FLOW VECTOR
C     HCOS      COSINE OF SOLAR HOUR ANGLE OF SUNRISE AND SUNSET
C     HI        ELEVATION ANGLE
C     HLH       MIXING HEIGHTS (METERS) FOR 24 HOURS
C     H2        SOLAR HOUR ANGLE OF SUNRISE AND SUNSET
C     I         FREQUENTLY USED DUMMY FOR DO INDEX
C     ICEIL     INPUT CEILING(HUNDREDS OF FEET)
C     ICN       DUMMY RELATED TO SOLAR RADIATION INDEX
C     ICOVER    OPAQUE CLOUD COVER(TENTHS)
C     ID        SURFACE METEOROLOGICAL STATION IDENTIFICATION FROM DISK
C     IDAY      DAY FROM MET. TAPE
C     IDC       MET TAPE IDENTIFICATION
C     IDFAC     NUMBER OF DAYS FROM FIRST OF YEAR TO END OF PREVIOUS
C                MONTH.
C     IDG       NUMERICAL DATA CORRESPONDING TO ICEIL
C     IDIG      ALPHA DIGITS TO COMPARE WITH ALPHA VARIABLES ON MET CARD
C     IDIR      WIND DIRECTION CATEGORY (10 DEGREES)
C     IDM       IDENTIFICATION FOR RADIOSONDE STATION USED TO DETERMINE
C               MIXING HEIGHT FROM DISK
C     IDY       INDEX FOR DAY LOOP
C     IFLAG     INDICATOR THAT END OF FILE HAS BEEN REACHED
C     IHOUR     HOUR
C     IHR       INTEGER HOUR
C     IMO       MONTH ON MET DATA.
C     IMONTH    MONTH
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C      IN          INPUT UNIT NUMBER, CARD READER
C      IND         INDICATOR FOR WIND SPEED
C      IO          UNIT NUMBER(6) - PRINTER OUTPUT
C      IRADX       RADIATION INDEX
C      IRAND       RANDOM DIGIT FROM 0 TO 9.
C      IREC        CURRENT RECORD ON MET. TAPE
C      IROOF       CEILING HEIGHT CODE
C      ISKY        SKY COVER(TENTHS)
C      ISPEED      INPUT WIND SPEED(KNOTS)
C      ITEMP       INPUT TEMPERATURE(DRY BULB - FARENHEIT)
C      IYEAR       YEAR FOR SURFACE DATA - 2 DIGITS. FROM DISK.
C      IYM         YEAR FOR MIXING HEIGHT DATA - 2 DIGITS FROM DISK.
C      IYRC        YEAR
C      J           DUMMY VARIABLE FOR OUTPUT LISTS
C      JI          DUMMY VARIABLE FOR DO LOOP INDEX
C      JK          DUMMY FOR DO LOOP INDEX
C      KHR         INDEX FOR HOURLY DO LOOP
C      KHRC        HOUR
C      KST         ARRAY OF CALCULATED HOURLY STABILITIES FOR EACH DAY
C      KSTSP       TEMPORARY STABILITY CLASS
C      LDAY        DAY OF MONTH FROM CARD FOR LAST HOUR
C      LMON        MONTH FROM CARD FOR LAST HOUR
C      LST         STABILITY CLASS FOR LAST HOUR
C      LSTAB       TABLE OF STABILITES INDEXED BY IND AND IRADX
C      LWD         LAST WIND DIRECTION(DEGREES)
C      LYS         INDICATOR: 1 FOR NORMAL YEAR, 2 FOR LEAP YEAR.
C      RAND(24)    INITIAL RANDOM NUMBER.
C      RANDU       SUBROUTINE TO GENERATE RANDOM NUMBERS
C      S           WIND SPEED (KNOTS)
C      SIGMA       VARIABLE TO ACCOUNT FOR ELLIPTICITY OF EARTH'S ORBIT
C      SIND        SIN OF DAYNO
C      SINLAT      SINE OF LATITUDE
C      SINTD       SIN OF TDAYNO
C      SPEED       WIND SPEED (METERS/SECOND)
C      TDAYNO      TWO TIMES DAYNO
C      TEMP        ARRAY OF HOURLY TEMPERATURES FOR EACH DAY
C      TEMPZ       INTERMEDIATE CALCULATION INVOLVING ZONE AND LONGITUDE
C      TSR         TIME OF SUNRISE
C      TSS         TIME OF SUNSET
C      XAF         TODAY'S MAXIMUM MIXING HEIGHT(METERS)
C      XAFM1       YESTERDAY'S MAXIMUM MIXING HEIGHT(METERS)
C      XAFP1       TOMORROW'S MAXIMUM MIXING HEIGHT(METERS)
C      XDIR        WIND DIRECTION (DEGREES)
C      XHR         FLOATING POINT HOUR
C      XMN         TODAY'S MINIMUM MIXING HEIGHT(METERS)
C      XMNM1       YESTERDAY'S MINIMUM MIXING HEIGHT(METERS)
C      XMNP1       TOMORROW'S MINIMUM MIXING HEIGHT(METERS)
C      ZONE        TIME ZONE OF SITE( GREENWICH MEAN TIME- LOCAL STANDARD TIME)

C     * * * G L O S S A R Y   O F   T E R M S   F O R   R A M Q * * *

C   RAMQ PROCESSES EMISSION INVENTORY INFORMATION. CONSTRUCTS AREA SOURCE
C    MAP ARRAY. RANKS POINT AND AREA SOURCES ACCORDING TO EXPECTED
C    IMPACT.
C                FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C                 IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C
C      A          TEMPORARY COEFFICIENT
C      ASVAL      SIGNIFICANCE- EMISSION RATE TIMES SIDE LENGTH.
C      AXCOF      URBAN COEFFICIENT FOR DIST. TO AREA MAX
C      AXCOR      RURAL COEFFICIENT FOR DIST. TO AREA MAX
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C      AXEXP    URBAN EXPONENT FOR DIST. TO AREA MAX.
C      AXEXR    RURAL EXPONENT FOR DIST. TO AREA MAX
C      B        TEMPORARY EXPONENT
C      COEFFR   NAMED COMMON-ARRAYS OF RURAL COEFFICIENTS AND EXPONENTS
C      COEFFU   NAMED COMMON-ARRAYS OF URBAN COEFFICIENTS AND EXPONENTS
C      C1       DUMMY TO WRITE OUTPUT IN USER UNITS
C      C2       DUMMY TO WRITE OUTPUT IN USER UNITS
C      C3       DUMMY TO WRITE OUTPUT IN USER UNITS
C      D        TEMPORARY SIDE LENGTH VALUE
C      F        BRIGGS BUOYANCY FLUX PARAMETER
C      HC       TEMPORARY HEIGHT CLASS AT 5 METER INTERVALS
C      HC1      HEIGHT CLASS SEPARATIONS(METERS)
C      HF       FINAL PLUME RISE(METERS) FOR CURRENT POINT SOURCE
C      HFIN     ARRAY OF  FINAL RISE(METERS) FOR EACH POINT SOURCE
C      IH       DO INDEX TO DETERMINE HEIGHT INDEX
C      IH1      HEIGHT VALUES FOR TABLE OUTPUT
C      IH2      HEIGHT VALUES FOR TABLE OUTPUT
C      IR       EAST IA INDEX FOR SOURCE NUMBER STORAGE
C      IRDIM    EAST MAXIMUM DIMENSIONS OF IA ARRAY (AREA SOURCE INDEX)
C      IRMAX    MAXIMUM INTEGER EAST  COORD. OF AREA SOURCES.
C      IRMIN    MINIMUM INTEGER EAST  COORD. OF AREA SOURCES.
C      IRX      MAXIMUM EAST IA INDEX FOR SOURCE NUMBER STORAGE
C      IS       HEIGHT CLASS INDEX AND NORTH IA INDEX FOR SOURCE NUMBER STORAGE
C      ISDIM    NORTH MAXIMUM DIMENSIONS OF IA ARRAY (AREA SOURCE INDEX)
C      ISMAX    MAXIMUM INTEGER NORTH COORD. OF AREA SOURCES.
C      ISMIN    MINIMUM INTEGER NORTH COORD. OF AREA SOURCES.
C      ISX      MAXIMUM NORTH IA FOR SOURCE NUMBER STORAGE
C      ITITLE   80 COLS OF INFORMATION TO BE USED AS OUTPUT TITLE
C      IWA      INTEGER AREA SOURCE SIDE LENGTH(USER UNITS)
C      LMAX     TEMPORARY NUMBER OF SOURCE WITH HIGHTEST CONCENTRATION
C      MAXA     MAXIMUM NUMBER OF AREA SOURCES,SECOND DIMENSION OF ASORC
C      MAXP     MAXIMUM NUMBER OF POINT SOURCES,SECOND DIM. OF SOURCE
C      NDIMA    MAXIMUM NUMBER OF AREA SOURCES
C      NDIMP    MAXIMUM NUMBER OF POINT SOURCES
C      NIN      INPUT DATA UNIT NUMBER(UNIT 5 ON THE UNIVAC 1110)
C      NS       TEMPORARY SOURCE NUMBER INDEX IN DO LOOP
C      PSVAL    SIGNIFICANCE VALUE
C      PXCOF    URBAN COEFFICIENT FOR DIST. TO POINT MAX
C      PXCOR    RURAL COEFFICIENT FOR DIST. TO POINT MAX
C      PXEXP    URBAN EXPONENT FOR DIST. TO POINT MAX
C      PXEXR    RURAL EXPONENT FOR DIST. TO POINT MAX
C      PXUCOF   URBAN COEFICIENT FOR CHI-U/Q POINT MAX
C      PXUCOR   RURAL COEFFICIENT FOR CHI-U/Q POINT MAX
C      PXUEXP   URBAN EXPONENT FOR CHI-U/Q POINT MAX
C      PXUEXR   RURAL EXPONENT FOR CHI-U/Q POINT MAX
C      RC       TEMPORARY WEST BOUNDARY OF AREA SOURCE
C      RCHECK   TEMPORARY EAST BOUNDARY OF AREA SOURCE
C      SC       TEMPORARY SOUTH BOUNDARY OF AREA SOURCE
C      SCHECK   TEMPORARY NORTH BOUNDARY OF AREA SOURCE
C      SF       AREA SIDE LENGTH (METERS)
C      SIGMAX   TEMPORARY LOCATION OF MAXIMUM CONC.
C      SIGNIF   DUMMY VARIABLE FOR TEMPORARY STORAGE OF SIGNIFICANCE VALUES.
C      TABLE    ARRAY CONTAINING FREQUENCY DISRTIBUTIONS
C      TITLE    SO2  OR PART FOR LEGENDS
C      TS       STACK TEMPERATURE(KELVIN)
C      WA       SIDE LENGTH(USER UNITS)
C
C
C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H R E C * * *

C        SUBROUTINE JMHREC DETERMINES LOCATIONS OF RECEPTORS DOWNWIND IN
C         THE RESULTANT DIRECTION FOR THE PERIOD FROM SIGNIFICANT POINT
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```
C          AND AREA SOURCES.
C              FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C               IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C      A        TEMPORARY COEFFICIENT
C      AB       TEMPORARY DISTANCE(INTERNAL UNITS)
C      B        TEMPORARY EXPONENT
C      C        TEMPORARY COEEFICIENT
C      C1       EAST COORD. IN USER UNITS FOR PRINTOUT
C      C2       NORTH COORD. IN USER UNITS FOR PRINTOUT
C      CONM     MAXIMUM ESTIMATED CONCENTRATION FROM A POINT SOURCE(G/M**3)
C      D        TEMPORARY EXPONENT
C      DTHDZ    D THETA/ DZ, CHANGE OF TEMPERATURE WITH HEIGHT.
C      F        BRIGGS BUOYANCY FLUX PARAMETER
C      H        EFFECTIVE AREA SOURCE HEIGHT(METERS)
C      HC1      BREAK POINT HEIGHTS FOR HEIGHT CLASSES(METERS)
C      HF       FINAL EFFECTIVE HEIGHT.
C      IH       DO LOOP INDEX TO FIND HEIGHT CLASS
C      IP       DO LOOP INDEX
C      IOPT(1)  CONTROL OPTION, POINT SOURCE INPUT?            0 = NO, 1 = YES.
C      IOPT(2)  CONTROL OPTION, AREA  SOURCE INPUT?            0 = NO, 1 = YES.
C      IOPT(4)  CONTROL OPTION, SIGNIFICANT POINT RECEPTORS?   0 = NO, 1 = YES.
C      IOPT(5)  CONTROL OPTION, SIGNIFICANT AREA  RECEPTORS?   0 = NO, 1 = YES.
C      IS       HEIGHT CLASS INDEX
C      JCHAR    AN 'A' TO INDICATE RECEPTOR GENERATED BY AREA SOURCE.
C      PL       EXPONENT FOR INCREASE OF WIND SPEED WITH HEIGHT.
C      Q        SOURCE EMISSION RATE(G/SEC)
C      RS       EAST CO-ORDINATE OF SOURCE
C      S        STABILITY PARAMETER
C      SS       NORTH CO-ORDINATE OF SOURCE
C      TS       STACK GAS TEMPERATURE(DEG-K)
C      UPL      WIND DIRECTION AT STACK HEIGHT.
C      WA       0.5*SOURCE SIDE LENGTH IN INTERNAL UNITS.
C      X        DISTANCE OF MAXIMUM CONCENTRATION(KILOMETERS)
C
C
C      * * * G L O S S A R Y   O F   T E R M S   F O R   J M H H O N * * *

C         SUBROUTINE JMHHON DETERMINES LOCATIONS OF A HEXAGONAL OR HONEYCOMB
C          ARRAY OF RECEPTOR POINTS SPACED GRIDSP APART AND ADDS TO THE
C          RECEPTOR LIST THOSE NOT HAVING ANOTHER RECEPTOR WITHIN 0.5 GRIDSP
C          OF THEIR LOCATION.
C              FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C               IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C      DISQ     SQUARE OF DISTANCE BETWEEN RECEPTOR AND HONEYCOMB POINT.
C      DLIM     SQUARE OF HALF THE DISTANCE BETWEEN HONEYCOMB RECEPTORS.
C      DUM      TEMPORARY STORAGE
C      DUM1     TEMPORARY STORAGE
C      DUM2     TEMPORARY STORAGE
C      HCOMBR   EAST COORDINATE OF CANDIDATE HONEYCOMB RECEPTORS.
C      HCOMBS   NORTH COORDINATE OF CANDIDATE HONEYCOMB RECEPTORS.
C      ICHAR    AN ALPHABETIC 'H' TO INDICATE RECEPTOR GENERATED BY
C                HONEYCOMB ROUTINE.
C      M        DO LOOP INDEX
C      N        DO LOOP INDEX
C      NBEES    NUMBER OF RECEPTORS GENERATED
C      NCOLS1   ESTIMATE OF THE NUMBER OF HONEYCOMB RECEPTORS IN ODD
C                NUMBERED ROWS.
C      NCOLS2   ESTIMATE OF THE NUMBER OF HONEYCOMB RECEPTORS IN EVEN
C                NUMBERED ROWS.
C      NROWS    ESTIMATED NUMBER OF HONEYCOMB RECEPTOR ROWS.
C      NULIM    TEMPORARY NUMBER OF RECEPTORS.
C      R        TEMPORARY EAST COORD. OF RECEPTOR
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C     RH        TEMPORARY EAST COORD. OF CANDIDATE HONEYCOMB RECEPTOR.
C     S         TEMPORARY NORTH COORD. OF RECEPTOR.
C     SH        TEMPORARY NORTH COORD. OF CANDIDATE HONEYCOMB RECEPTOR.
C     XCD1      EAST COORDINATE OF HONEYCOMB RECEPTOR(ODD ROWS)
C     XCD2      EAST COORDINATE OF HONEYCOMB RECEPTOR(EVEN ROWS)
C     XINC      EAST SPACING INCREMENT
C     YCD       NORTH COORDINATE OF HONEYCOMB GENERATED RECEPTOR.
C     YINC      NORTH SPACING INCREMENT
C               THE FOLLOWING ARE DUMMY VARIABLES USED IN JMHHON FOR TEMPORARY
C               STORAGE: DUM,DUM1, AND DUM2.
C
C
C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H 5 4 U(R) * * *

C   JMH54U(R) CALCULATES TABLES OF CONCENTRATIONS FROM AREA SOURCES THAT
C    EXTEND UPWIND FROM A RECEPTOR TO VARIOUS DISTANCES. A TABLE IS
C    PRODUCED FOR EACH SOURCE HEIGHT (FROM ONE TO THREE).
C               FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C                IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C     CI        INTEGRATED CHI * U/QA.
C     CL        CHI * U/QA FOR LAST ITERATION.
C     CP        CHI * U/QA  AT THIS DISTANCE.
C     DELX      DISTANCE INCREMENT (KILOMETERS).
C     H         TEMPORARY STORAGE OF AREA SOURCE HEIGHT(METERS)
C     HARE      ARRAY OF MODIFIED AREA HTS. FOR WHICH CONC. TABLES ARE GENERATED.
C     ID        INDEX FOR CIN STORAGE.
C     IH        INDEX FOR HEIGHT CLASS LOOP
C     JD        CONTROL FOR SIZE OF DISTANCE INCREMENT.
C     JMHCZU    SUBROUTINE TO CALCULATE CONCENTRATIONS FROM INFINITE LINE SOURCES
C               AT A DISTANCE,X,UPWIND FROM A RECEPTOR(JMHCZR FOR RURAL VERSIONS)
C     N         INCREMENT FOR INITIAL STORAGE.
C     NC        INCREMENT LIMIT FOR INITIAL STORAGE.
C     PL        EXPONENT FOR INCREASE OF WIND SPEED WITH HEIGHT.
C     SZ        SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                VERTICAL DIRECTION(METERS)
C     TT        TRAVEL TIME FROM SOURCE TO THIS RECEPTOR(KM-SEC/M)
C     UPL       WIND SPEED AT AREA SOURCE HEIGHT(METERS/SECOND)
C     X         DISTANCE UPWIND (KILOMETERS).


C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H C Z U(R)  * * *

C   JMHCZU(R) CALCULATES CONCENTRATIONS FROM INFINITE LINE SOURCES AT A
C   DISTANCE, X, UPWIND FROM A RECEPTOR.
C               FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C                IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C     AN        THE NUMBER OF SUMMATIONS CALCULATED
C     BRSZ      SUBROUTINE CALLED TO OBTAIN SIGMA-Z(PGSZ IN RURAL VERSION)
C     H         AREA SOURCE HEIGHT(METERS)
C     IWRI      OUTPUT UNIT (6).
C     KST       STABILITY CLASS FOR THIS HOUR.
C     RCZ       RELATIVE CONCENTRATION NORMALIZED FOR WIND SPEED FROM AN
C                INFINITE LINE SOURCE.
C     SZ        SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                VERTICAL DIRECTION(METERS)
C     THL       TWICE THE MIXING HEIGHT
C     X         UPWIND DISTANCE FROM RECEPTOR TO SOURCE (KILOMETERS).
C               THE FOLLOWING ARE ALL DUMMY VARIABLES USED IN JMHCZU(R) FOR
C               TEMPORARY STORAGE: A1,A2,A3,A4,A5,A6,A7,C1,C2,C3,C4,C5,C6,C7,C8,
C               C9,CA,CB,CC,CD,CE,CF,SUM,AND T.
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C     ***GLOSSARY OF TERMS FOR BRSZ***

C   BRSZ DETERMINES URBAN SIGMA-Z FOR THE SOURCE-RECEPTOR DISTANCE, X.
C     KST       STABILITY CLASS FOR THIS HOUR.
C     SZ        SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                VERTICAL DIRECTION(METERS)
C     X         SOURCE-RECEPTOR DISTANCE IN METERS.
C     XK        SOURCE-RECEPTOR DISTANCE IN KM.

C     ***GLOSSARY OF TERMS FOR PGSZ***

C   PGSZ DETERMINES RURAL SIGMA-Z FOR THE SOURCE-RECEPTOR DISTANCE, X.
C     KST       STABILITY CLASS FOR THIS HOUR.
C     SZ        SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                VERTICAL DIRECTION(METERS)
C     X         SOURCE-RECEPTOR DISTANCE (KILOMETERS)

C     ***GLOSSARY OF TERMS FOR JMHARE***

C   JMHARE INTEGRATES ALONG THE LINE UPWIND FROM THE RECEPTOR IN ORDER
C   TO OBTAIN THE EFFECT OF ALL AREA SOURCES ALONG THIS LINE.
C        SUBROUTINE JMHARE DETERMINES THE CONCENTRATION FROM AREA SOURCES
C         AT ALL RECEPTORS FOR A GIVEN HOUR.  THE 'NARROW PLUME HYPOTHESIS'
C         IS USED, I.E., AREA SOURCES DIRECTLY UPWIND ARE ASSUMED
C         REPRESENTATIVE OF AREA SOURCES AFFECTING THE RECEPTOR.
C        JMHARE CALLS SUBROUTINE JMHPOL FOR INTERPOLATION OF THE
C          INTEGRATED VALUE TABLES GENERATED BY SUBROUTINE JMH54U(R)
C             FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C              IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C     ADELR     SMALL EAST-WEST INCREMENT TO STEP INTO NEXT UPWIND AREA
C                SOURCE.
C     ADELS     SMALL NORTH-SOUTH INCREMENT TO STEP INTO NEXT UPWIND AREA
C                SOURCE.
C     BPHM      ARRAY CONTAINING MODIFIED BREAK POINT HEIGHTS
C     CONC      INTEGRATED CONCENTRATION FROM X = 0 TO DIST.
C     CONCL     INTEGRATED CONCENTRATION FROM X = 0 TO XL.
C     D         HALF SIDE LENGTH(USER UNITS)
C     DELR      EAST  INCREMENT, FUNCTION OF WIND QUADRANT.
C     DELS      NORTH INCREMENT, FUNCTION OF WIND QUADRANT.
C     DIFF      INTEGRATED CONC. BETWEEN XL AND DIST.
C     DIST      DISTANCE IN INTERNAL UNITS FROM RRE,SRE TO BOUNDARY
C     DX        DIST(INTERNAL UNITS) FROM RRE,SRE TO LOCUS.
C     DXMIN     DISTANCE TO CLOSEST LOCUS(INTERNAL UNITS)
C     H         TEMPORARY STORAGE OF A BREAKPOINT HEIGHT
C     HA        AREA EFFECTIVE HEIGHT(METERS)
C     ICNT      NUMBER OF LOCI FOUND.
C     IH        HEIGHT CLASS
C     IHL       LAST HEIGHT CLASS USED.
C     IOPT(8)   CONTROL OPTION, SOURCE CONTRIBUTIONS TO DISK? 0 = NO, 1 = YES.
C     IR        DUMMY VARIABLE FOR EAST-WEST INDEX.
C     IS        DUMMY VARIABLE FOR NORTH-SOUTH INDEX.
C     JMHPOL    SUBROUTINE TO INTERPOLATE CONC. FROM JMH54U(R) GENERATED TABLES.
C     K         INDEX FOR RECEPTOR LOOP
C     KSIG      SIGNIFICANCE RANK OR ZERO.
C     L         DUMMY DO INDEX TO LOCATE LOCI
C     NS        SOURCE NUMBER (FROM IA ARRAY).
C     PHT       PHYSICAL AREA SOURCE HEIGHT(METERS)
C     PL        EXPONENT FOR INCREASE OF WIND SPEED WITH HEIGHT.
C     PROD      PARTIAL CONC. AT KTH RECEPTOR FROM THIS(NS) AREA SOURCE.
C     QA        AREA EMISSION RATE (G/SEC-M**2).
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C      R         EAST  COORD OF LOCUS: THE RAY THETA AND SM.
C      RB        R UPWIND BOUNDARY FOR THIS SOURCE.
C      RC        EAST  COORD OF SOURCE CENTER.
C      RDUM      EAST  COORD OF POINT JUST INSIDE NEXT AREA SOURCE
C      RLOC      EAST  COORD OF CLOSEST LOCUS
C      RM        EAST  COORDINATE  OF BOUNDARY.
C      RMINI     MINIMUM EAST COORDINATE OF AREA SOURCES
C      RMR       EAST DISTANCE FROM RRE,SRE TO BOUNDARY RM
C      RRE       EAST RECEPTOR COORDINATE
C      S         NORTH COORD OF LOCUS: THE RAY THETA AND RM
C      SB        S UPWIND BOUNDARY FOR THIS SOURCE.
C      SC        NORTH COORD OF SOURCE CENTER.
C      SDUM      NORTH COORD OF POINT JUST INSIDE NEXT AREA SOURCE
C      SLOC      NORTH COORD OF CLOSEST LOCUS
C      SM        NORTH COORDINATE OF BOUNDARY.
C      SMINI     MINIMUM NORTH COORDINATE OF AREA SOURCES
C      SMS       NORTH DISTANCE FROM RRE,SRE TO BOUNDARY SM.
C      SRE       NORTH RECEPTOR COORDINATE
C      THT       TEMPORARY HEIGHT FOR WIND SPEED COMPUTATION.
C      UPL       WIND SPEED AT AREA SOURCE HEIGHT(METERS)
C      XD1       UPWIND DISTANCE FROM RRE,SRE TO RB
C      XD2       UPWIND DISTANCE FROM RRE,SRE TO SB
C      XL        UPWIND DISTANCE(KM) TO LAST POINT WHERE INTEGRATION WAS
C                 CALCULATED.
C
C
C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H P O L * * *

C    JMHPOL CALLED BY JMHARE INTERPOLATES THE TABLES GENERATED BY JMH54U(R)
C    FOR A GIVEN UPWIND DISTANCE.
C              FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C               IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C      CONC     VALUE INTERPOLATED FROM TABLE.
C      D        DUMMY TO CALCULATE DISTANCE, XL.
C      IH       HEIGHT INDEX, BETWEEN 1 AND 3.
C      J        INDEX TO OBTAIN CIN FOR DISTANCE LESS THAN X.
C      K        INDEX TO OBTAIN CIN FOR DISTANCE GREATER THAN X.
C      KREC     CURRENT RECEPTOR NUMBER
C      X        UPWIND DISTANCE(KM).
C      XL       DISTANCE LESS THAN X.
C      XU       DISTANCE GREATER THAN X.


C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H P T U(R) * * *

C    JMHPTU(R) DETERMINES CONCENTRATIONS FROM ALL POINT SOURCES AT ALL
C    RECEPTORS FOR A GIVEN HOUR.
C              FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C               IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C      BUOY     PARTIAL CALCULATION OF BRIGGS F
C      D        STACK TOP INSIDE DIAMETER
C      DBTRCU   SUBROUTINE THAT DETERMINES RELATIVE CONCENTRATION AT A RECEPTOR
C               FROM A POINT SOURCE AT A GIVEN UPWIND AND CROSSWIND DISTANCE.
C                   (DBTRCR FOR RURAL VERSIONS)
C      DELHF    STABLE MOMENTUM PLUME RISE
C      DELT     STACK GAS TEMPERATURE MINUS AMBIENT AIR TEMPERATURE
C      DHA      UNSTABLE MOMENTUM PLUME RISE
C      DISTF    DISTANCE OF FINAL RISE(KILOMETERS)
C      DTHTZ    D THETA/DZ, CHANGE OF TEMP. WITH HEIGHT
C      DTMB     DELTA-T FOR BUOYANCY-MOMENTUM DELTA-H CROSSOVER
C      DUM      INTERMEDIATE STORAGE
C      F        BRIGGS BUOYANCY FLUX PARAMETER
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C      FP          ARRAY OF F'S FOR EACH SOURCE
C      HF          FINAL EFFECTIVE HEIGHT (METERS).
C      HPR         ARRAY OF H-PRIMES FOR EACH SOURCE.
C      HPRM        H-PRIME, CORRECTED STACK HEIGHT FOR STACK DOWNWASH
C      HX          PLUME HEIGHT FOR DISTANCE X
C      IOPT(8)     CONTROL OPTION, SOURCE CONTRIBUTIONS TO DISK? 0 = NO, 1 = YES.
C      IOPT(13)    CONTROL OPTION, READ HOURLY EMISSIONS?        0 = NO, 1 = YES.
C      J           POINT SOURCE INDEX.
C      K           RECEPTOR INDEX.
C      KSIG        SIGNIFICANT POINT SOURCE INDEX.
C      PL          EXPONENT FOR INCREASE OF WIND SPEED WITH HEIGHT.
C      PROD        CONCENTRATION CONTRIBUTION FROM JTH SOURCE TO KTH RECEPTOR
C      RQ          EAST  COORDINATE OF SOURCE.
C      S           STABILITY PARAMETER
C      SCALE       VALUE TO SCALE EXIT VELOCITY ACCORDING TO EMISSIONS
C      SQ          NORTH COORDINATE OF SOURCE.
C      SY          SIGMA Y, STANDARD DEVIATION OF CONCENTRATION IN THE
C                   CROSSWIND DIRECTION(METERS)
C      SZ          SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                   VERTICAL DIRECTION(METERS)
C      THT         TEMPORARY PHYSICAL STACK HEIGHT
C      TS          STACK GAS TEMPERATURE(K)
C      TT          TRAVEL TIME FROM SOURCE TO RECEPTOR(KM-SEC/M)
C      UPH         ARRAY OF WIND SPEEDS AT STACK TOP FOR EACH POINT SOURCE.
C      UPL         WIND SPEED AT STACK HEIGHT(METERS/SECOND)
C      VS          STACK GAS VELOCITY(METERS/SECOND)
C      X           UPWIND DISTANCE FROM RECEPTOR TO SOURCE (KILOMETERS).
C      XDUM        SOURCE EAST  COORD. MINUS RECEPTOR EAST  COORD.
C      Y           CROSSWIND DISTANCE FROM RECEPTOR TO SOURCE (KILOMETERS).
C      YDUM        SOURCE NORTH COORD. MINUS RECEPTOR NORTH COORD.

C     * * * G L O S S A R Y   O F   T E R M S   F O R   D B T R C U(R) * * *

C  DBTRCU(R) DETERMINES RELATIVE CONCENTRATION AT A RECEPTOR FROM A POINT
C   SOURCE AT A GIVEN UPWIND AND CROSSWIND DISTANCE.
C              FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C               IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C      AN          THE NUMBER OF SUMMATIONS CALCULATED.
C      BRSYSZ      CALLED TO OBTAIN SIGMA-Y AND SIGMA-Z(PGSYSZ IN RURAL VERSION)
C      H           EFFECTIVE POINT SOURCE HEIGHT(METERS)
C      HL          HEIGHT OF THE MIXING DEPTH(METERS)
C      IWRI        OUTPUT UNIT (UNIT 6 ON THE UNIVAC 1110).
C      RC          RELATIVE CONCENTRATION, CHI/Q.
C      SY          SIGMA Y, STANDARD DEVIATION OF CONCENTRATION IN THE
C                   CROSSWIND DIRECTION(METERS)
C      SZ          SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                   VERTICAL DIRECTION(METERS)
C      THL         TWO TIMES THE MIXING HEIGHT
C      U           WIND SPEED FOR THIS HOUR(METERS/SECOND)
C      X           UPWIND DISTANCE FROM RECEPTOR TO SOURCE (KILOMETERS).
C      Y           CROSSWIND DISTANCE FROM RECEPTOR TO SOURCE(KILOMETERS).
C      YD          CROSSWIND DISTANCE IN METERS.
C      Z           RECEPTOR HEIGHT(METERS)
C                  THE FOLLOWING ARE ALL DUMMY VARIABLES USED IN DBTRCU(R) FOR
C                  TEMPORARY STORAGE: A1,A2,A3,A4,A5,A6,A7,C1,C2,C3,C4,C5,C6,C7,C8,
C                  C9,CA,CB,CC,CD,CE,CF,DUM,SUM,T,AND TEMP.

C     * * * G L O S S A R Y   O F   T E R M S   F O R   B R S Y S Z * * *

C  BRSYSZ DETERMINES URBAN SIGMA-Y AND SIGMA-Z FOR THE SOURCE-RECEPTOR
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C   DISTANCE, X.
C     KST       STABILITY CLASS FOR THIS HOUR.
C     SY        SIGMA Y, STANDARD DEVIATION OF CONCENTRATION IN THE
C                CROSSWIND DIRECTION(METERS)
C     SZ        SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                VERTICAL DIRECTION(METERS)
C     X         SOURCE-RECEPTOR DISTANCE IN METERS.
C     XK        SOURCE-RECEPTOR DISTANCE IN KILOMETERS.

C     * * * G L O S S A R Y   O F   T E R M S   F O R   P G S Y S Z * * *

C  PGSYSZ DETERMINES RURAL SIGMA-Y AND SIGMA-Z FOR THE SOURCE-RECEPTOR
C   DISTANCE, X.
C     KST       STABILITY CLASS FOR THIS HOUR.
C     SY        SIGMA Y, STANDARD DEVIATION OF CONCENTRATION IN THE
C                CROSSWIND DIRECTION(METERS)
C     SZ        SIGMA Z, STANDARD DEVIATION OF CONCENTRATION IN THE
C                VERTICAL DIRECTION(METERS)
C     X         SOURCE-RECEPTOR DISTANCE (KILOMETERS)

C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H O U R * * *

C        SUBROUTINE JMHOUR WRITES OUTPUT FOR EACH HOUR.
C             FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C              IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C     C1        RECEPTOR EAST COORD.(USER UNITS)
C     C2        RECEPTOR NORTH COORD.(USER UNITS)
C     CMAX      TEMPORARY STORAGE OF MAXIMUM CONCENTRATION.
C     GRANDS    TOTAL CONCENTRATION FOR THIS RECEPTOR(G/M**3)
C     GRANDT    TOTAL CONCENTRATION FOR THIS RECEPTOR, USED FOR RANKING
C                CONCENTRATIONS(G/M**3)
C     IOPT(1)   CONTROL OPTION,    POINT SOURCE INPUT?        0 = NO, 1 = YES.
C     IOPT(2)   CONTROL OPTION,    AREA  SOURCE INPUT?        0 = NO, 1 = YES.
C     IOPT(9)   CONTROL OPTION, HOURLY SUMMARIES ONLY?        0 = NO, 1 = YES.
C     IRANK     CONCENTRATION RANK OF RECEPTOR.
C     K         RECEPTOR INDEX.
C     LMAX      RECEPTOR NUMBER OF TEMPORARY MAXIMUM.
C
C
C     * * * G L O S S A R Y   O F   T E R M S   F O R   J M H F I N * * *

C        SUBROUTINE JMHFIN WRITES OUTPUT AVERAGED FOR NAVG.
C             FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C              IN THIS GLOSSARY, SEE GLOSSARY FOR RAM.
C     AWU       CONCENTRATION FOR THIS RECEPTOR FROM AREA SOURCE(MICRO-G/M**3)
C     BPHM      ARRAY CONTAINING MODIFIED BREAK POINT HEIGHTS
C     C1        EAST COORD. OF RECEPTOR(USER UNITS)
C     C2        NORTH COORD. OF RECEPTOR(USER UNITS)
C     CMAX      TEMPORARY STORAGE OF MAXIMUM CONCENTRATION.
C     GRANDS    TOTAL CONCENTRATION FOR THIS RECEPTOR(G/M**3)
C     GRANDT    TOTAL CONCENTRATION FOR THIS RECEPTOR, USED FOR RANKING
C                CONCENTRATIONS(G/M**3)
C     GWU       TOTAL CONC. FOR THIS RECEPTOR(MICROGRAMS/M**3)
C     HARE      ARRAY OF MODIFIED AREA-HTS. FOR WHICH CONC. TABLES ARE GENERATED
C     IOPT(1)   CONTROL OPTION,    POINT SOURCE INPUT?        0 = NO, 1 = YES.
C     IOPT(2)   CONTROL OPTION,    AREA  SOURCE INPUT?        0 = NO, 1 = YES.
C     IOPT(10) CONTROL OPTION, PUNCH CARDS FOR CONTOURS?      0 = NO, 1 = YES.
C     IPOLT     ALPHA ARRAY: 'SO2' OR 'PART'.
C     IPOLU     ALPHA DESIGNATOR FOR POLLUTANT USED: 'SO2' OR 'PART'.
C     IRANK     RANK OF CONCENTRATION FOR THIS RECEPTOR.
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C     LMAX      RECEPTOR NUMBER OF TEMPORARY MAXIMUM.
C     PWU       CONCENTRATION FOR THIS RECEPTOR FROM POINT SOURCES(MICRO-G/M**3)

C         * * * G L O S S A R Y  O F  T E R M S  F O R  J M H F D * * *

C           SUBROUTINE JMHFD WRITES OUTPUT AVERAGED FOR NAVG
C           AND ACCUMULATES SUMS FOR ANNUAL AVERAGES, HIGHEST DAY AND HIGHEST
C           HOUR TABLES. FOR VARIABLES APPEARING IN THE PROGRAM BUT NOT LISTED
C           HERE SEE GLOSSARY FOR RAM.
C
C     ANNSUM    AN ARRAY CONTAINING CUMULATIVE DAILY CONC. SUM AT EACH RECEPTOR
C     BPHM      ARRAY CONTAINING MODIFIED BREAK POINT HEIGHTS
C     C1        EAST COORD. OF RECEPTOR(USER UNITS)
C     C2        NORTH COORD. OF RECEPTOR(USER UNITS)
C     CMAX      TEMPORARY STORAGE OF MAX. CONCENTRATIONS
C     DMAX      AN ARRAY CONTAINING THE 5 HIGHEST DAILY CONCENTRATIONS
C                AND THE DAY OF OCCURRENCE FOR EACH RECEPTOR
C     GRANDS    TOTAL CONCENTRATION FOR THIS RECEPTOR(G/M**3)
C     GRANDT    TOTAL CONCENTRATION FOR THIS RECEPTOR, USED FOR RANKING
C     HARE      ARRAY OF MODIFIED AREA HTS. FOR WHICH CONC. TABLES ARE GENERATED
C     HMAX      AN ARRAY CONTAINING THE 5 HIGHEST HOURLY CONCENTRATIONS , DATE-
C                AND HOUR OF OCCURRENCE FOR EACH RECEPTOR
C     IJ        DUMMY VARIABLE USED IN SUBSCRIPTING OF DMAX AND HMAX ARRAYS
C     IJP1      DUMMY VARIABLE USED IN SUBSCRIPTING OF DMAX AND HMAX
C     IPOLT     ALPHA ARRAY: 'SO2' OR 'PART'.
C     IPOLU     ALPHA DESIGNATOR FOR POLLUTANT USED: 'SO2' OR 'PART'.
C     IRANK     RANK OF CONCENTRATION FOR THIS RECEPTOR.
C     LMAX      MARKS THE RECEPTOR NO. OF THE HIGHEST CONC. IN THAT SEARCH
C     SUM       NAMED COMMON AREA CONTAINING ANNSUM,HMAX AND DMAX
C
C
C     * * * G L O S S A R Y  O F  T E R M S  F O R  C U M F * * *

C   CUMF PRINTS AND PLOTS CUMULATIVE FREQUENCY DISTRIBUTIONS OF 24-HOUR
C   CONCENTRATIONS.
C     ALOG      LIBRARY FUNCTION TO OBTAIN LOGS TO BASE 10.
C     AMIN      CANDIDATE MINIMUM
C     CHI       ARRAY OF CONCENTRATION PLOTTING POSITIONS.
C     CJI       CONCENTRATION ARRAY (DAYS BY STATIONS)
C     CON       LIST OF DAILY CONCENTRATIONS IN MICROGRAMS PER CUBIC
C                METER  FOR ONE STATION.
C     CONC      ARRAY OF CONCENTRATIONS FOR PLOTTING.
C     DAY1      DAY NUMBER ON MODEL OUTPUT DISK RECORDS
C     F         LIST OF FREQUENCIES TO TEST FOR PLOTTING POINTS.
C     FA        FREQUENCY POSITION FOR EACH DAY.
C     FQ        ARRAY OF PROBABILITY PLOTTING POSITIONS.
C     FREQ      FREQUENCIES CORRESPONDING TO EACH CONCENTRATION.
C     GRAPH     SUBROUTINE TO DRAW THE BASE CHART FOR LOG-PROBABILITY PLOTS.
C     HD1,HD2   ALPHA CHARACTERS FOR PLOTTING.
C     HD3,HDY   ALPHA CHARACTERS FOR PLOTTING
C     IMAX      NUMBER OF STATIONS FOR WHICH CONCENTRATIONS WERE
C                TRANSMITTED ON DISK.
C     INT1      SYMBOL CODE, '4' = 'X'.
C     IRD       READ INPUT UNIT (5)
C     IWRI      WRITE OUTPUT UNIT (6)
C     JDAY      JULIAN DAY NUMBER OF THIS DISK RECORD.
C     JDYR      NO. OF DAYS IN THE YEAR.
C     JM1       ONE LESS THAN THE NUMBER OF DAYS IN A YEAR.
C     KNTR      COUNT OF PLOTTING POSITIONS.
C     NBEG      FIRST LINE WITH 7 ITEMS PER LINE.
C     ND        LIST OF DAY NUMBERS.
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C      NEND      NUMBER OF LINES WITH 8 ITEMS PER LINE.
C      NLOG      THE NUMBER OF LOG CYCLES ON THE CONCENTRATION SCALE.
C      NPLOT     PLOT NUMBER
C      PROB      FUNCTION TO CONVERT FROM FREQUENCY TO PROBABILITY
                  PLOTTING POSITION.
C      R         EAST  COORDINATE OF STATION.
C      S         NORTH COORDINATE OF STATION.
C      SCALE     CONVERSION FROM GIVEN UNITS TO MICROGRAMS PER CUBIC METER.
C      STA       STATION NUMBER.
C      SUM       CUMULATIVE SUM OF CONCENTRATIONS TO DETERMINE ANNUAL MEAN
C      TEST      HIGHEST CONCENTRATION VALUE THAT CAN BE PLOTTED.
C      TITLE     80 CHARACTER TITLE.
C      TLN1      TITLE, TRANSFERRED FROM RAMF (SAME AS LINE1)
C      TLN2      TITLE, TRANSFERRED FROM RAMF (SAME AS LINE2)
C      TLN3      TITLE, TRANSFERRED FROM RAMF (SAME AS LINE3)
C      XE        EAST  COORDINATES OF STATIONS
C      XDIM      THE HORIZONTAL DIMENSION OF THE PLOT IN INCHES.
C      YBASE     THE MINIMUM VALUE ON THE CONCENTRATION SCALE.
C      YDIM      THE VERTICAL DIMENSION OF THE PLOT IN INCHES.
C      YN        NORTH COORDINATES OF STATIONS
C    THE FOLLOWING ARE DUMMY VARIABLES USED IN CUMF: A,ADUM,B,D,DENOM,I,J,K,
           KBEG,L,LF,LN,M,N,N2,N3,N4,N5,N6,N7,N8,NA
C    THE FOLLOWING ARE PLOTTER SUBROUTINES: GRAPH,LINE,NUMBER,PLOT,PLOTS,SYMBOL
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3. RAMQ - INPUT FORMATS AND EXAMPLE RUNSTEAMS

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RAMQDOC
C  RAMQ PREPARES EMISSION INVENTORY INFORMATION FOR INPUT INTO RAM, CONSTRUCTS
C   AN AREA MAP ARRAY, AND RANKS POINT AND AREA SOURCES ACCORDING TO EXPECTED
C   IMPACT. OUTPUT FROM RAMQ IS REQUIRED AS INPUT TO ALL THE RAM VERSIONS.

***** CARD INPUT TO RAMQ *****

CARD 1 (13A6,A2)   ITITLE     80 CHARACTER TITLE
 EXAMPLE:
RUN OF RAMQ,   ED KRENSHAW, REGION XV, EPA, TEST CITY DATA (1 JAN 78)


CARD 2 (FREE FORMAT)      NDIMP,NDIMA,IPOL,MOD
  NDIMP  ESTIMATED NUMBER OF POINT SOURCES. NDIMP MUST BE SET TO ZERO IF RUN IS
        JUST FOR AREA SOURCES(NO POINT SOURCES).
  NDIMA  ESTIMATED NUMBER OF AREA  SOURCES. NDIMA MUST BE SET TO ZERO IF RUN IS
        JUST FOR POINT SOURCES(NO AREA SOURCES).
  IPOL   POLLUTANT INDICATOR: USE 3 FOR SO2 OR 4 FOR SUSPENDED PARTICULATE
  MOD    DISPERSION PARAMETER INDICATOR: USE 1 FOR RURAL, 2 FOR URBAN
 EXAMPLE:
 12, 15, 3, 2


CARD 3 (FREE FORMAT)    UNITS,CONONE
  UNITS  NUMBER OF USER UNITS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH.
  CONONE MULTIPLIER CONSTANT TO CONVERT LENGTH IN USER UNITS TO KILOMETERS.
 EXAMPLE:
2.0, 1.609344


CARD TYPE 4  (2A6,8F8.2)  (PNAME(I,NPT),I=1,2),(SOURCE(I,NPT),I=1,8)
  ONE CARD FOR EACH POINT SOURCE
(PNAME(I,NPT),I=1,2)  UP TO 12 ALPHANUMERIC CHARACTERS FOR SOURCE IDENTIFICATION
  SOURCE(1,NPT)  EAST  COORDINATE OF POINT SOURCE (USER UNITS)
  SOURCE(2,NPT)  NORTH COORDINATE OF POINT SOURCE (USER UNITS)
  SOURCE(3,NPT)  SULFUR DIOXIDE EMISSION RATE (G/SEC)
  SOURCE(4,NPT)  PARTICULATE EMISSION RATE (G/SEC)
  SOURCE(5,NPT)  PHYSICAL STACK HEIGHT (METERS)
  SOURCE(6,NPT)  STACK GAS TEMPERATURE (DEGREES KELVIN)
  SOURCE(7,NPT)  STACK INSIDE TOP DIAMETER (METERS)
  SOURCE(8,NPT)  STACK GAS EXIT VELOCITY (METERS/SEC)

NOTE: IF NDIMP=0  NO POINT CARDS ARE READ.

 EXAMPLE:
PLANT 1     579.50  4406.75 232.365 13.335  82.9    513.1   3.5     13.7

CONTROL CARD TO SIGNAL END OF POINT SOURCE CARDS.
      HAS 'END POINTS' IN CARD COLUMNS 1 TO 10.
 EXAMPLE:
END POINTS

CARD TYPE 5 ( FREE FORMAT)
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 ONE CARD FOR EACH AREA SOURCE
  ASORC(1,NAS)    EAST COORD. OF SW CORNER OF AREA SOURCE (USER UNITS)
  ASORC(2,NAS)    NORTH COORD OF SW CORNER OF AREA SOURCE (USER UNITS)
  ASORC(5,NAS)    SIDE LENGTH OF AREA SOURCE (USER UNITS)
  ASORC(3,NAS)    SULFUR DIOXIDE EMISSION RATE FOR ENTIRE AREA (G/SEC)
  ASORC(4,NAS)    PARTICULATE    EMISSION RATE FOR ENTIRE AREA (G/SEC)
  ASORC(6,NAS)    AREA SOURCE HEIGHT (METERS)
(NOTE THAT ASORC(5,NAS) - SIDE LENGTH IS READ OUT OF ORDER TO CONFORM WITH THE
EXISTING ORDER OF IPP EMISSIONS DATA. IF NDIMA =0 NO AREA CARDS ARE READ.)
 EXAMPLE:
570., 4400., 4.,   1.25, 0.0, 10.


*****DISK OUTPUT FROM RAMQ*****
     THE OUTPUT EMISSIONS DATA IS WRITTEN IN UNFORMATTED FORTRAN
     RECORDS TO UNIT 9 AND IS REQUIRED INPUT TO ALL RAM VERSIONS.


*****EXAMPLE RUN STREAM*****

@RUN,D/R JOBNAME/15,ACCNT-NO/USERID,PROJ-ID,1,10
@PASSWD PASSWORD
@ASG,CP RAMQOUT.                                  . OUTPUT FILE FROM RAMQ
@USE 9,RAMQOUT
@XQT A999*UNAMAP.RAMQ                             . PROGRAM FILE
RUN OF RAMQ,   ED KRENSHAW, REGION XV, EPA, TEST CITY DATA (1 JAN 78)
 12, 15, 3, 2
 2.0, 1.609344
PLANT 1     579.50  4406.75 232.365 13.335  82.9    513.1   3.5     13.7
PLANT 2     575.25  4405.25 150.465 57.005  76.2    464.3   3.2     12.5
PLANT 3     571.25  4407.00  19.005  3.255  25.9    477.6   1.0     15.8
PLANT 4     571.75  4402.25  81.060 28.350  40.8    499.8   2.8     17.6
PLANT 5     579.50  4403.25  26.145  5.145  18.3    533.2   0.6     14.7
PLANT 6     567.14  4400.89   2.56   0.     26.5    505.    1.04    3.81
PLANT 7     564.70  4407.50  36.43   0.     48.8    464.    3.05    18.6
PLANT 8     577.45  4401.35  33.64   0.     26.5    428.    1.68    5.02
PLANT 9     576.75  4400.70  38.8    0.      6.     654.     .79    24.89
PLANT 10    580.10  4412.00 299.5    0.     93.     405.    4.88    12.59
PLANT 11    583.0   4400.90  16.74   0.     18.1    506.    1.37    4.23
PLANT 12    574.0   4398.00 226.2    0.     93.6    483.    4.88    12.59
END POINTS
570., 4400., 4.,   1.25, 0.0, 10.
574., 4400., 2.,   3.05, 0.0, 10.
576., 4400., 2.,   6.25, 0.0, 12.
578., 4400., 2.,   8.85, 0.0, 15.
578., 4402., 2.,   3.15, 0.0, 10.
574., 4402., 4.,   0.00, 0.0,  0.
570., 4404., 4.,   4.25, 0.0, 15.
574., 4406., 2.,   2.60, 0.0, 10.
578., 4406., 2.,   3.10, 0.0, 12.
580., 4406., 2.,   2.76, 0.0, 20.
582., 4406., 2.,    .83, 0.0, 20.
580., 4404., 2.,  1.66, 0.0, 20.
582., 4404., 2.,  1.90, 0.0, 20.
580., 4402., 2.,   .51, 0.0, 20.
582., 4402., 2.,  1.48, 0.0, 20.

C*****************************************************************
C
C  THE PRECEEDING RUN STREAM HAD A RUN TIME OF 5.11 SECONDS ON THE
C  UNIVAC 1110 AND REQUIRED 15-K WORDS OF MEMORY(APPROXIMATELY 5,534 WORDS
C  FOR INSTRUCTIONS AND 8,523 WORDS OF DATA)
```

****
* EXAMPLE PRINTOUT FROM RAMQ *
****

RUN OF RAMQ, ED KRENSHAW, REGION XV, EPA, TEST CITY DATA (1 JAN 78)

RAMQ RUN USING URBAN COEFFICIENTS

THIS RUN EXPECTS 12 POINT SOURCES AND 15 AREA SOURCES.

GENERAL INFORMATION FROM RAMQ, VERSION 78124

UNITS - THERE ARE 2.0000000 USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH (INTERNAL UNIT)
CONONE - THERE ARE 1.6093440 KILOMETERS PER USER UNIT
CONTWO - IT IS CALCULATED THAT THERE ARE 3.2186880 KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH (INTERNAL UNIT)
THIS RUN IS FOR SO2 SINCE IPOL= 3

POINT SOURCE INFORMATION

SOURCE	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)	SO2(G/SEC) EMISSIONS	PART(G/SEC) EMISSIONS	STACK HT(M)	STACK TEMP(K)	STACK DIAM(M)	STACK VEL(M/SEC)	SIGNIFICANCE (MICROG/M**3)	EFF HT(M)
1 PLANT 1	579.50	4406.75	232.36	13.34	82.9	513.1	3.5	13.7	155.81	370.46
2 PLANT 2	575.25	4405.25	150.47	57.01	76.2	464.3	3.2	12.5	144.90	299.49
3 PLANT 3	571.25	4407.00	19.01	3.25	25.9	477.6	1.0	15.8	199.06	80.26
4 PLANT 4	571.75	4402.25	81.06	28.35	40.8	499.8	2.8	17.6	82.10	291.02
5 PLANT 5	579.50	4403.25	26.14	5.14	18.3	533.2	.6	14.7	818.14	45.14
6 PLANT 6	567.14	4400.89	2.56	.00	26.5	505.0	1.0	3.8	72.30	47.61
7 PLANT 7	564.70	4407.50	36.43	.00	48.8	464.0	3.1	18.6	31.99	316.17
8 PLANT 8	577.45	4401.35	33.64	.00	26.5	428.0	1.7	5.0	461.53	69.51
9 PLANT 9	576.75	4400.70	38.80	.00	6.0	654.0	.8	24.9	448.91	76.11
10 PLANT 10	580.10	4412.00	299.50	.00	93.0	405.0	4.9	12.6	171.83	406.00
11 PLANT 11	583.00	4400.90	16.74	.00	18.1	506.0	1.4	4.2	389.31	52.68
12 PLANT 12	574.00	4398.00	226.20	.00	93.6	483.0	4.9	12.6	97.50	480.29

AREA SOURCE INFORMATION

SOURCE	EAST COORD (USER	NORTH COORD UNITS)	SO2 EMISSIONS (GRAMS/M**2/SEC)	PART EMISSIONS	SIDE LENGTH (USER UNITS)	EFFECTIVE HEIGHT (METERS)	SIGNIFICANCE (G/M/SEC)
1	570.0	4400.0	3.0164-08	0.0000	4.0	10.0	1.9418-04
2	574.0	4400.0	2.9440-07	0.0000	2.0	10.0	9.4759-04
3	576.0	4400.0	6.0328-07	0.0000	2.0	12.0	1.9418-03
4	578.0	4400.0	8.5425-07	0.0000	2.0	15.0	2.7496-03
5	578.0	4402.0	3.0406-07	0.0000	2.0	10.0	9.7866-04
6	574.0	4402.0	0.0000	0.0000	4.0	.0	0.0000
7	570.0	4404.0	1.0256-07	0.0000	4.0	15.0	6.6021-04
8	574.0	4406.0	2.5097-07	0.0000	2.0	10.0	8.0778-04
9	578.0	4406.0	2.9923-07	0.0000	2.0	12.0	9.6313-04
10	580.0	4406.0	2.6641-07	0.0000	2.0	20.0	8.5749-04
11	582.0	4406.0	8.0116-08	0.0000	2.0	20.0	2.5787-04
12	580.0	4404.0	1.6023-07	0.0000	2.0	20.0	5.1574-04
13	582.0	4404.0	1.8340-07	0.0000	2.0	20.0	5.9030-04
14	580.0	4402.0	4.9228-08	0.0000	2.0	20.0	1.5845-04
15	582.0	4402.0	1.4286-07	0.0000	2.0	20.0	4.5981-04

AREA SOURCE MAP ARRAY (IA)

```
4    7  7  8  0  9 10 11
3    7  7  6  6  0 12 13
2    1  1  6  6  5 14 15
1    1  1  2  3  4  0  0

     1  2  3  4  5  6  7
```

THE ORIGIN IN INTERNAL UNITS IS (284.00, 2199.00)
THE SIZE OF THE AREA SOURCE ARRAY IS (7, 4)
RMIN= 285.00 RMAX= 292.00 SMIN= 2200.00 SMAX= 2204.00 (IN INTERNAL UNITS)

TOTAL SO2 EMISSION AND CUMULATIVE FRACTION ACCORDING TO HEIGHT

HEIGHT(M)	TOTAL POINT EMISSIONS(G/S)	CUMULATIVE FRACTION	TOTAL AREA EMISSIONS(G/S)	CUMULATIVE FRACTION
0 - 5	.00	.000	.00	.000
6 - 10	38.80	.033	10.05	.241
11 - 15	.00	.033	22.45	.780
16 - 20	42.88	.070	9.14	1.000
21 - 25	.00	.070	.00	1.000
26 - 30	55.20	.118	.00	1.000
31 - 35	.00	.118	.00	1.000
36 - 40	.00	.116	.00	1.000
41 - 45	81.06	.187	.00	1.000
46 - 50	36.43	.219	.00	1.000
51 - 55	.00	.219	.00	1.000
56 - 60	.00	.219	.00	1.000
61 - 65	.00	.219	.00	1.000
66 - 70	.00	.219	.00	1.000
71 - 75	.00	.219	.00	1.000
76 - 80	150.47	.348	.00	1.000
81 - 85	232.36	.548	.00	1.000
86 - 90	.00	.548	.00	1.000
91 - 95	525.70	1.000	.00	1.000
96 -100	.00	1.000	.00	1.000
TOTAL	1162.91		41.64	

SIGNIFICANT SO2 POINT SOURCES

RANK	CHI-MAX (MICROGRAMS/M**3)	SOURCE NO.
1	818.14	5
2	461.53	8
3	448.91	9
4	389.31	11
5	199.06	3
6	171.83	10
7	155.81	1
8	144.90	2
9	97.50	12
10	82.10	4
11	72.30	6
12	31.99	7

SIGNIFICANT SO2 AREA SOURCES

RANK	Q*LENGTH (G/M/SEC)	SOURCE NO.
1	2.7496-03	4
2	1.9418-03	3
3	9.7866-04	5
4	9.6313-04	9
5	9.4759-04	2
6	8.5749-04	10
7	8.0778-04	8
8	6.6021-04	7
9	5.9030-04	13
10	5.1574-04	12

```
C****  PROGRAM R A M Q  ***********  78124 VERSION                                  RMQ0010
C    THIS IS THE EMISSIONS PREPROCESSOR  USED IN CONJUNCTION WITH RAM.             RMQ0020
C    RAMQ IS RESPONSIBLE FOR MAKING THE NECESSARY DATA CONVERSIONS ON              RMQ0030
C    THE RAW EMISSIONS DATA IN ORDER TO ESTABLISH A STANDARD DATA BANK             RMQ0040
C    WHICH WILL BE ACCEPTABLE TO RAM.                                              RMQ0050
C    IN ORDER TO MAKE THE PREPROCESSOR FLEXIBLE ENOUGH TO ACCEPT                   RMQ0060
C    SOURCE INPUT IN ANY COORDINATE SYSTEM AND YET COMPLY WITH THE                 RMQ0070
C    PROGRAM RESTRICTIONS, ALL COORDINATES ARE CONVERTED TO AN                     RMQ0080
C    INTERNAL GRID SYSTEM WHICH DEPENDS ON A USER SPECIFIED GRID                   RMQ0090
C    SQUARE SIZE.  MOST CALCULATIONS ARE PERFORMED USING THIS                      RMQ0100
C    INTERNAL COORDINATE SYSTEM .  A CONVERSION FACTOR FROM USER                   RMQ0110
C    UNITS TO KILOMETERS IS APPLIED WHEN NECESSARY.                                RMQ0120
C    RAMQ USES 2 SUBROUTINES:                                                      RMQ0130
C      BLOCK -BLOCK DATA FOR URBAN SIGMAS                                          RMQ0140
C      BLOCKR -BLOCK DATA FOR RURAL SIGMAS                                         RMQ0150
      COMMON /COEFFU/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),AXCO         RMQ0160
     1F(6,9),AXEXP(6,9),HC1(10)                                                   RMQ0170
      COMMON /COEFFR/ PXCOR(6,9),PXEXR(6,9),PXUCOR(6,9),PXUEXR(6,9),AXCO         RMQ0180
     1R(6,9),AXEXR(6,9)                                                           RMQ0190
      DIMENSION IA(25,25), SOURCE(9,250), ASORC(6,100), TITLE(2), MPS(25         RMQ0200
     1), MAS(10), TABLE(4,21), SIGNIF(250), ASVAL(100), PSVAL(250), ITIT         RMQ0210
     2LE(14), HFIN(250), PNAME(2,250), MODEL(2)                                   RMQ0220
      DATA MAXP /250/ ,MAXA /100/ ,IRDIM /25/ ,ISDIM /25/                         RMQ0230
C***MAXP EQUALS SECOND DIMENSION OF SOURCE.                                       RMQ0240
C***MAXA EQUALS SECOND DIMENSION OF ASORC.                                        RMQ0250
C***IRDIM AND ISDIM EQUAL THE TWO DIMENSIONS OF IA.                               RMQ0260
      DATA TITLE /'SO2 ','PART'/ ,IRSIZE,ISSIZE /1,1/                             RMQ0270
      DATA MODEL /'RURAL ','URBAN '/                                              RMQ0280
C***                                                                              RMQ0290
C***          POINT SOURCE INFORMATION                                            RMQ0300
C***                                                                              RMQ0310
C***SOURCE(9, PT SOURCES)      1=EAST CO-ORD(USER UNITS)                          RMQ0320
C***                           2=NORTH CO-ORD(USER UNITS)                         RMQ0330
C***                           3=SO2 EMISSION RATE(G/SEC)                         RMQ0340
C***                           4=PART EMISSION RATE(G/SEC)                        RMQ0350
C***                           5=STACK HEIGHT(M)                                  RMQ0360
C***                           6=STACK TEMP(K)                                    RMQ0370
C***                           7=STACK DIAM(M)                                    RMQ0380
C***                           8=STACK VELOCITY(M/S)                              RMQ0390
C***                           9=PARTIAL BUOYANCY CALCULATION                     RMQ0400
C***PNAME - 12 CHARACTER PLANT IDENTIFICATION                                     RMQ0410
C***          AREA SOURCE INFORMATION                                             RMQ0420
C***ASORC(6, AREA SOURCES)  1=EAST CO-ORD(USER UNITS)                             RMQ0430
C***                        2=NORTH CO-ORD(USER UNITS)                            RMQ0440
C***                        3=SO2 EMISSION RATE(G/SEC)                            RMQ0450
C***                        4=PART EMISSION RATE(G/SEC)                           RMQ0460
C***                        5=SIDE LENGTH(USER UNITS)                             RMQ0470
C***                        6=AREA SOURCE HEIGHT(M)                               RMQ0480
C***INITIALIZATIONS                                                               RMQ0490
C***THE UNIVAC 1110 AUTOMATICALLY ZEROS ALL VARIABLES. IF THE USER'S              RMQ0500
C***COMPUTER SYSTEM DOES NOT ASSUME ALL VARIABLES ARE INITIALLY ZERO,             RMQ0510
C***THE FOLLOWING VARIABLES MUST BE ZEROED: IA,SOURCE,ASORC,MPS,MAS,RMAX          RMQ0520
C***,SMAX,NPT,NAS, AND TABLE.                                                     RMQ0530
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```
      RMIN=99999.
      SMIN=99999.                                                        RMQ0540
      IN=5                                                               RMQ0550
      IO=6                                                               RMQ0560
      NSIGP=25                                                           RMQ0570
      NSIGA=10                                                           RMQ0580
      NIN=5                                                              RMQ0590
      NID=9                                                              RMQ0600
C***READ RUN IDENTIFICATION - TITLE CARD                                 RMQ0610
      READ (IN,480) ITITLE                                               RMQ0620
C***READ IN THE MAXIMUM NUMBER OF POINT SOURCES AND AREA SOURCES          RMQ0630
C***EXPECTED . ALSO SIGNIFY POLLUTANT TO BE MODELED, 3=SO2 4=PARTICULATE  RMQ0640
C***AND TYPE OF AREA TO BE MODELED,RURAL OR URBAN.                        RMQ0650
C***  MOD=1 FOR RURAL SIGMAS, MOD=2 FOR URBAN SIGMAS.                    RMQ0660
      READ (IN,490) NDIMP,NDIMA,IPOL,MOD                                 RMQ0670
C***NDIMP AND NDIMA CAN NOT EXCEED DIMENSIONS OF POINT AND AREA SOURCE   RMQ0680
C***INFORMATION RESPECTIVELY.                                            RMQ0690
      WRITE (IO,510) ITITLE                                              RMQ0700
      WRITE (IO,450) MODEL(MOD)                                          RMQ0710
      WRITE(IO,710) NDIMP,NDIMA                                          RMQ0720
C***INPUT GRID SQUARE SIZE, NUMBER OF USER UNITS EQUAL TO SIDE LENGTH OF  RMQ0730
C***SMALLEST AREA SOURCE SQUARE, AND APPROPRIATE CONVERSION FACTOR.       RMQ0740
C***CONVERSION IS ALWAYS FROM SPECIFIED USER UNITS TO KILOMETERS***       RMQ0750
C***EXAMPLE CONVERSION FACTORS:                                          RMQ0760
C***        FEET TO KM      3.048E-04                                    RMQ0770
C***        MILES TO KM     1.609344E+00                                 RMQ0780
C***        METERS TO KM    1.0E-03                                      RMQ0790
C***                                                                     RMQ0800
      READ (IN,490) UNITS,CONONE                                         RMQ0810
C***DETERMINE CONVERSION FROM INTERNAL UNITS TO KILOMETERS.               RMQ0820
      CONTWO=CONONE*UNITS                                                RMQ0830
      IP=IPOL-2                                                          RMQ0840
      WRITE(IO,720) UNITS,CONONE,CONTWO,TITLE(IP),IPOL                   RMQ0850
C***READ POINT SOURCES***                                                RMQ0860
C***IF NOT EXPECTING POINT SOURCES, SKIP.                                RMQ0870
      IF (NDIMP.EQ.0) GO TO 170                                          RMQ0880
10    NPT=NPT+1                                                          RMQ0890
      IF (NPT.GT.MAXP+1) GO TO 120                                       RMQ0900
      READ (NIN,470) (PNAME(I,NPT),I=1,2),(SOURCE(I,NPT),I=1,8)          RMQ0910
C***CARD WITH 'END POINTS' IN COL 1-10 IS USED TO SIGNIFY END OF POINT    RMQ0920
C***SOURCES.                                                             RMQ0930
      IF (PNAME(1,NPT).EQ.'END PO') GO TO 130                            RMQ0940
C***SOURCE CO-ORDINATES ARE TRANSFORMED INTO INTERNAL UNITS.              RMQ0950
      SOURCE(1,NPT)=SOURCE(1,NPT)/UNITS                                  RMQ0960
      SOURCE(2,NPT)=SOURCE(2,NPT)/UNITS                                  RMQ0970
C***CALCULATE BUOYANCY FACTOR                                            RMQ0980
      D=SOURCE(7,NPT)                                                    RMQ0990
      SOURCE(9,NPT)=2.45153*SOURCE(8,NPT)*D*D                            RMQ1000
C***2.45153 IS GRAVITY OVER FOUR.                                        RMQ1010
C***STORE POINT EMISSIONS ACCORDING TO HEIGHT CLASS                      RMQ1020
      DO 20 I=1,20                                                       RMQ1030
      HC=I*5.                                                            RMQ1040
      IF (SOURCE(5,NPT).LE.HC) GO TO 30                                  RMQ1050
20    CONTINUE                                                           RMQ1060
C***POINT SOURCES WITH PHYSICAL HEIGHTS GT 100 METERS ARE LISTED         RMQ1070
C***SEPARATELY.                                                          RMQ1080
      WRITE (IO,500) NPT,SOURCE(5,NPT),SOURCE(IPOL,NPT)                  RMQ1090
      GO TO 40                                                           RMQ1100
C***ADD EMISSION RATE INTO TABLE AND TOTAL.                              RMQ1110
30    TABLE(1,I)=TABLE(1,I)+SOURCE(IPOL,NPT)                             RMQ1120
40    TABLE(1,21)=TABLE(1,21)+SOURCE(IPOL,NPT)                           RMQ1130
C***DETERMINE SIGNIFICANT POINT SOURCES                                  RMQ1140
                                                                         RMQ1150
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C***SIGNIFICANCE IS DETERMINED BY SELECTING A SPECIFIED NUMBER          RMQ1160
C***OF POINT SOURCES (N < OR = 25) CONTRIBUTING TO THE HIGHEST         RMQ1170
C***PREDICTED MAXIMUM CONCENTRATIONS.  MAX CONCENTRATION IS            RMQ1180
C***PREDICTED BY CHI(MAX) = (A*H**B)*Q/U WHERE A AND B ARE THE         RMQ1190
C***COEFFICIENT AND EXPONENT,RESPECTIVELY, OF A MAXIMUM CHI*U/Q        RMQ1200
C***VALUE PRECALCULATED FOR B STABILITY AND A SPECIFIC EFFECTIVE       RMQ1210
C***HEIGHT CLASS.  THE FINAL PLUME RISE OF THE SOURCE IS CALCULATED    RMQ1220
C*** WITH B STABILITY AND A 3 M/SEC WIND SPEED.                        RMQ1230
C*** Q IS THE SOURCE STRENGTH IN G/SEC. U IS THE WIND                  RMQ1240
C***SPEED SET TO 3 M/SEC.                                              RMQ1250
      U=3.0                                                            RMQ1260
      TEMP=293.                                                        RMQ1270
      TS=SOURCE(6,NPT)                                                 RMQ1280
      IF (TS.GT.TEMP) GO TO 50                                         RMQ1290
      HF=SOURCE(5,NPT)                                                 RMQ1300
      GO TO 70                                                         RMQ1310
50    F=SOURCE(9,NPT)*(TS-TEMP)/TS                                     RMQ1320
      IF (F.GE.55) GO TO 60                                            RMQ1330
      HF=SOURCE(5,NPT)+21.425*F**0.75/U                                RMQ1340
      GO TO 70                                                         RMQ1350
60    HF=SOURCE(5,NPT)+38.71*F**0.6/U                                  RMQ1360
70    HFIN(NPT)=HF                                                     RMQ1370
C***DETERMINE HEIGHT INDEX.                                            RMQ1380
      DO 80 IH=2,9                                                     RMQ1390
      IF (HF.LT.(HC1(IH)-.01)) GO TO 90                                RMQ1400
80    CONTINUE                                                         RMQ1410
      IH=10                                                            RMQ1420
90    IS=IH-1                                                          RMQ1430
      IF (MOD.EQ.1) GO TO 100                                          RMQ1440
      A=PXUCOF(2,IS)                                                   RMQ1450
      B=PXUEXP(2,IS)                                                   RMQ1460
      GO TO 110                                                        RMQ1470
100   A=PXUCOR(2,IS)                                                   RMQ1480
      B=PXUEXR(2,IS)                                                   RMQ1490
110   SIGNIF(NPT)=(A*HF**B)*SOURCE(IPOL,NPT)/U                         RMQ1500
C***GO BACK AND READ DATA FOR ANOTHER POINT SOURCE.                    RMQ1510
      GO TO 10                                                         RMQ1520
120   WRITE (IO,430) MAXP                                              RMQ1530
      CALL EXIT                                                        RMQ1540
130   NPT=NPT-1                                                        RMQ1550
      WRITE (IO,520)                                                   RMQ1560
C***LIST POINT SOURCE INFORMATION.                                     RMQ1570
      DO 140 I=1,NPT                                                   RMQ1580
      C1=SOURCE(1,I)*UNITS                                             RMQ1590
      C2=SOURCE(2,I)*UNITS                                             RMQ1600
140   WRITE (IO,530) I,(PNAME(J,I),J=1,2),C1,C2,(SOURCE(K,I),K=3,8),SIGN RMQ1610
     1IF(I),HFIN(I)                                                    RMQ1620
C***RANK 25 HIGHEST POINT SOURCES***                                   RMQ1630
      IF (NPT.LT.NSIGP) NSIGP=NPT                                      RMQ1640
      DO 160 I=1,NSIGP                                                 RMQ1650
      SIGMAX=-1.0                                                      RMQ1660
      DO 150 J=1,NPT                                                   RMQ1670
      IF (SIGNIF(J).LE.SIGMAX) GO TO 150                               RMQ1680
      SIGMAX=SIGNIF(J)                                                 RMQ1690
      LMAX=J                                                           RMQ1700
150   CONTINUE                                                         RMQ1710
      MPS(I)=LMAX                                                      RMQ1720
      PSVAL(I)=SIGMAX                                                  RMQ1730
160   SIGNIF(LMAX)=-1.0                                                RMQ1740
C***READ AREA SOURCES***                                               RMQ1750
C***IF NOT EXPECTING AREA SOURCES, SKIP.                               RMQ1760
170   IF (NDIMA.EQ.0) GO TO 340                                        RMQ1770
```

```
      NAS=NAS+1                                                          RMQ1780
      IF (NAS.GT.MAXA+1) GO TO 210                                       RMQ1790
      READ (NIN,490,END=220) ASORC(1,NAS),ASORC(2,NAS),ASORC(5,NAS),ASOR RMQ1800
     1C(3,NAS),ASORC(4,NAS),ASORC(6,NAS)                                 RMQ1810
C***CO-ORDINATES ARE TRANSLATED TO INTERNAL UNITS.                       RMQ1820
      ASORC(1,NAS)=ASORC(1,NAS)/UNITS                                    RMQ1830
      ASORC(2,NAS)=ASORC(2,NAS)/UNITS                                    RMQ1840
C***STORE AREA EMISSIONS ACCORDING TO HEIGHT CLASS                       RMQ1850
      DO 180 I=1,20                                                      RMQ1860
      HC=I*5.                                                            RMQ1870
      IF (ASORC(6,NAS).LE.HC) GO TO 190                                  RMQ1880
180   CONTINUE                                                           RMQ1890
C***AREA SOURCES WITH HEIGHTS GT 100 METERS ARE LISTED SEPARATELY.       RMQ1900
      WRITE (IO,540) NAS,ASORC(6,NAS),ASORC(IPOL,NAS)                    RMQ1910
      GO TO 200                                                          RMQ1920
C***ADD EMISSION RATE INTO TABLE AND TOTAL.                              RMQ1930
190   TABLE(3,I)=TABLE(3,I)+ASORC(IPOL,NAS)                              RMQ1940
200   TABLE(3,21)=TABLE(3,21)+ASORC(IPOL,NAS)                            RMQ1950
C***CALCULATE SIDE LENGTH IN UNITS                                       RMQ1960
      ASORC(5,NAS)=ASORC(5,NAS)/UNITS                                    RMQ1970
      WA=ASORC(5,NAS)                                                    RMQ1980
C***CONVERTS SIDE LENGTH IN INTERNAL UNITS TO METERS AND ADJUST EMISSION RMQ1990
C***RATE                                                                 RMQ2000
      SF=WA*1000.*CONTWO                                                 RMQ2010
C***DETERMINE EMISSION RATE IN G/SEC-M**2.                               RMQ2020
      ASORC(3,NAS)=ASORC(3,NAS)/(SF*SF)                                  RMQ2030
      ASORC(4,NAS)=ASORC(4,NAS)/(SF*SF)                                  RMQ2040
C***FOR AREA SOURCES SIGNIFICANCE IS DETERMINED BY SELECTING A           RMQ2050
C***SPECIFIED NUMBER OF AREA SOURCES (N < OR = 10) WHICH HAVE            RMQ2060
C***THE HIGHEST EMISSION RATE TIMES THE SIDE LENGTH OF THE AREA          RMQ2070
C***SOURCE.                                                              RMQ2080
      SIGNIF(NAS)=SF*ASORC(IPOL,NAS)                                     RMQ2090
C***READJUST AREA SOURCE REGION BOUNDARIES AS REQUIRED(INTERNAL UNITS).  RMQ2100
      RC=ASORC(1,NAS)                                                    RMQ2110
      SC=ASORC(2,NAS)                                                    RMQ2120
      IF (RC.LT.RMIN) RMIN=RC                                            RMQ2130
      IF (SC.LT.SMIN) SMIN=SC                                            RMQ2140
      RCHEK=RC+WA                                                        RMQ2150
      SCHEK=SC+WA                                                        RMQ2160
      IF (RCHEK.GT.RMAX) RMAX=RCHEK                                      RMQ2170
      IF (SCHEK.GT.SMAX) SMAX=SCHEK                                      RMQ2180
C***GO BACK AND READ DATA FOR ANOTHER AREA SOURCE.                       RMQ2190
      GO TO 170                                                          RMQ2200
210   WRITE (IO,440) MAXA                                                RMQ2210
      CALL EXIT                                                          RMQ2220
220   NAS=NAS-1                                                          RMQ2230
C***LIST AREA SOURCE INFORMATION.                                        RMQ2240
      WRITE (IO,550)                                                     RMQ2250
      DO 230 I=1,NAS                                                     RMQ2260
      C1=ASORC(1,I)*UNITS                                                RMQ2270
      C2=ASORC(2,I)*UNITS                                                RMQ2280
      C3=ASORC(5,I)*UNITS                                                RMQ2290
      WRITE (IO,560) I,C1,C2,(ASORC(K,I),K=3,4),C3,ASORC(6,I),SIGNIF(I)  RMQ2300
230   CONTINUE                                                           RMQ2310
C***DETERMINE SIZE OF AREA ARRAY                                         RMQ2320
      RDUM=RMAX-RMIN+.0005                                               RMQ2330
      IRSIZE=RDUM                                                        RMQ2340
      IF(RDUM-FLOAT(IRSIZE).GT.0.001)    GO TO 730                       RMQ2350
      SDUM=SMAX-SMIN+.0005                                               RMQ2360
      ISSIZE=SDUM                                                        RMQ2370
      IF(SDUM-FLOAT(ISSIZE).GT.0.001) GO TO 740                          RMQ2380
C***CHECK SIZE OF AREA SOURCE REGION WITH DIMENSIONS OF IA ARRAY.         RMQ2390
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      IF (IRSIZE.GT.IRDIM) GO TO 240                                    RMQ2400
      IF (ISSIZE.LE.ISDIM) GO TO 250                                    RMQ2410
240   WRITE (IO,570) IRSIZE,ISSIZE                                      RMQ2420
      CALL EXIT                                                         RMQ2430
C***ZERO IA ARRAY(AREA SOURCE MAP ARRAY)                                RMQ2440
250   DO 260 I=1,IRSIZE                                                 RMQ2450
      DO 260 J=1,ISSIZE                                                 RMQ2460
260   IA(I,J)=0                                                         RMQ2470
C***LOOP THROUGH ALL AREA SOURCES AND STORE SOURCE NO'S IN IA.          RMQ2480
C***THERE CAN BE NO OVERLAPPING OF AREA SOURCES. LOCATIONS ARE          RMQ2490
C***DEFINED BY THE INTERNAL GRID SYSTEM.                                RMQ2500
      RMINI=RMIN-1.                                                     RMQ2510
      SMINI=SMIN-1.                                                     RMQ2520
      DO 280 NS=1,NAS                                                   RMQ2530
      IR=ASORC(1,NS)-RMINI+.0005                                        RMQ2540
      IS=ASORC(2,NS)-SMINI+.0005                                        RMQ2550
      IWA=ASORC(5,NS)+.0005-1.                                          RMQ2560
      ISX=IS+IWA                                                        RMQ2570
      IRX=IR+IWA                                                        RMQ2580
      DO 270 I=IR,IRX                                                   RMQ2590
      DO 270 J=IS,ISX                                                   RMQ2600
C***CHECK TO SEE IF IA ALREADY HAS A SOURCE IN THE I,J TH POSITION      RMQ2610
      IF (IA(I,J).EQ.0) GO TO 270                                       RMQ2620
      WRITE (IO,590) IA(I,J),I,J,NS                                     RMQ2630
      CALL EXIT                                                         RMQ2640
C***STORE SOURCE NO. IN APPROPRIATE POSITION                            RMQ2650
270   IA(I,J)=NS                                                        RMQ2660
280   CONTINUE                                                          RMQ2670
C***PRINT OUT AREA SOURCE MAP ARRAY(IA) IF NOT TOO LARGE TO FIT ACROSS  RMQ2680
C***PAGE.                                                               RMQ2690
      IF (IRSIZE.GT.41) GO TO 300                                       RMQ2700
      WRITE(IO,700)                                                     RMQ2710
      JLIM=ISSIZE+1                                                     RMQ2720
      DO 290 JDUM=1,ISSIZE                                              RMQ2730
      J=JLIM-JDUM                                                       RMQ2740
290   WRITE (IO,610) J,(IA(I,J),I=1,IRSIZE)                             RMQ2750
      WRITE (IO,620) (I,I=1,IRSIZE)                                     RMQ2760
      GO TO 310                                                         RMQ2770
300   WRITE (IO,460)                                                    RMQ2780
C***PRINT OUT ORIGIN CO-ORDINATES                                       RMQ2790
310   WRITE (IO,580) RMINI,SMINI,IRSIZE,ISSIZE                          RMQ2800
      WRITE (IO,600) RMIN,RMAX,SMIN,SMAX                                RMQ2810
C***                                                                    RMQ2820
C***RANK HIGHEST 10 AREA SOURCES                                        RMQ2830
      IF (NSIGA.GT.NAS) NSIGA=NAS                                       RMQ2840
      DO 330 I=1,NSIGA                                                  RMQ2850
      SIGMAX=-1.0                                                       RMQ2860
      DO 320 J=1,NAS                                                    RMQ2870
      IF (SIGNIF(J).LE.SIGMAX) GO TO 320                                RMQ2880
      SIGMAX=SIGNIF(J)                                                  RMQ2890
      LMAX=J                                                            RMQ2900
320   CONTINUE                                                          RMQ2910
      MAS(I)=LMAX                                                       RMQ2920
      ASVAL(I)=SIGMAX                                                   RMQ2930
330   SIGNIF(LMAX)=-1.0                                                 RMQ2940
C***OUTPUT SOURCE-STRENGTH-HEIGHT TABLE                                 RMQ2950
C***THIS TABLE DISPLAYS THE TOTAL EMISSIONS FOR BOTH POINT AND          RMQ2960
C***AREA SOURCES AND THE CUMULATIVE FREQUENCY ACCORDING TO              RMQ2970
C***HEIGHT CLASS. REQUIRED INPUT TO RAM, SUCH AS HEIGHT CLASS BOUNDARIES RMQ2980
C***FOR AREA SOURCES AND REPRESENTATIVE HEIGHTS FOR EACH                RMQ2990
C***  HEIGHT CLASS, CAN BE DETERMINED FROM THESE TABLES.                RMQ3000
340   WRITE (IO,630) TITLE(IP)                                          RMQ30
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C***HEIGHT CLASS EMISSIONS ARE IN 1 AND 3.                                      RMQ3020
C***DETERMINE CUMULATIVE PERCENT IN 2 AND 4.                                    RMQ3030
      IF (TABLE(1,21).EQ.0.0) TABLE(1,21)=1.0                                   RMQ3040
      IF (TABLE(3,21).EQ.0.0) TABLE(3,21)=1.0                                   RMQ3050
      IH1=0                                                                     RMQ3060
      IH2=5                                                                     RMQ3070
      TABLE(2,1)=TABLE(1,1)/TABLE(1,21)                                         RMQ3080
      TABLE(4,1)=TABLE(3,1)/TABLE(3,21)                                         RMQ3090
      WRITE (IO,640) IH1,IH2,(TABLE(J,1),J=1,4)                                 RMQ3100
      DO 350 I=2,20                                                             RMQ3110
      IH2=I*5                                                                   RMQ3120
      IH1=IH2-4                                                                 RMQ3130
      TABLE(2,I)=TABLE(1,I)/TABLE(1,21)+TABLE(2,I-1)                            RMQ3140
      TABLE(4,I)=TABLE(3,I)/TABLE(3,21)+TABLE(4,I-1)                            RMQ3150
      WRITE (IO,640) IH1,IH2,(TABLE(J,I),J=1,4)                                 RMQ3160
350   CONTINUE                                                                  RMQ3170
      IF (NDIMP.EQ.0) TABLE(1,21)=0.0                                           RMQ3180
      IF (NDIMA.EQ.0) TABLE(3,21)=0.0                                           RMQ3190
      WRITE (IO,650) TABLE(1,21),TABLE(3,21)                                    RMQ3200
C***OUTPUT TABLES FOR SIGNIFICANT SOURCES                                       RMQ3210
      IF (NDIMP.EQ.0) GO TO 370                                                 RMQ3220
      WRITE (IO,660) TITLE(IP)                                                  RMQ3230
      DO 360 I=1,NSIGP                                                          RMQ3240
      WRITE (IO,670) I,PSVAL(I),MPS(I)                                          RMQ3250
360   CONTINUE                                                                  RMQ3260
370   IF (NDIMA.EQ.0) GO TO 390                                                 RMQ3270
      WRITE (IO,690) TITLE(IP)                                                  RMQ3280
      DO 380 I=1,NSIGA                                                          RMQ3290
      WRITE (IO,680) I,ASVAL(I),MAS(I)                                          RMQ3300
380   CONTINUE                                                                  RMQ3310
C***                                                                            RMQ3320
C***CREATE OUTPUT FILES TO BE USED AS INPUT TO RAM.                             RMQ3330
C***OUTPUT POINT SOURCE INFORMATION TO DISK OR TAPE                             RMQ3340
390   WRITE (NID) UNITS,CONTWO,CONONE,IPOL,NPT,MPS,PNAME,MOD                    RMQ3350
      DO 400 I=1,9                                                              RMQ3360
400   WRITE (NID) (SOURCE(I,J),J=1,NPT)                                         RMQ3370
C***OUTPUT AREA SOURCE INFORMATION AND MAXIMA                                   RMQ3380
      WRITE (NID) NAS,MAS,RMIN,RMAX,SMIN,SMAX,IRSIZE,ISSIZE                     RMQ3390
      DO 410 I=1,6                                                              RMQ3400
410   WRITE (NID) (ASORC(I,J),J=1,NAS)                                          RMQ3410
      DO 420 I=1,IRSIZE                                                         RMQ3420
420   WRITE (NID) (IA(I,J),J=1,ISSIZE)                                          RMQ3430
      CALL EXIT                                                                 RMQ3440
730   WRITE(IO,735)                                                             RMQ3450
735   FORMAT(' AREA SOURCES, UNITS OR SIDE LENGTH SPECIFIED INCORRECTLY;        RMQ3460
     * ERROR ON EAST MAX BOUNDARY.')                                            RMQ3470
      STOP                                                                      RMQ3480
740   WRITE(IO,745)                                                             RMQ3490
745   FORMAT(' AREA SOURCES, UNITS OR SIDE LENGTH SPECIFIED INCORRECTLY;        RMQ3500
     * ERROR ON NORTH MAX BOUNDARY.')                                           RMQ3510
C                                                                               RMQ3520
430   FORMAT (' USER TRIED TO INPUT MORE THAN ',I4,' POINT SOURCES. THIS        RMQ3530
     1 GOES BEYOND THE CURRENT PROGRAM DIMENSIONS.')                            RMQ3540
440   FORMAT (' USER TRIED TO INPUT MORE THAN ',I4,' AREA SOURCES.',' TH        RMQ3550
     1IS GOES BEYOND THE CURRENT PROGRAM DIMENSIONS.')                          RMQ3560
450   FORMAT(10X,' RAMQ RUN USING ',A6,'COEFFICIENTS'/1X)                       RMQ3570
460   FORMAT (' AREA ARRAY IS TOO WIDE FOR PAGE SIZE, THEREFORE WILL NOT        RMQ3580
     1 BE PRINTED')                                                             RMQ3590
470   FORMAT (2A6,8F8.2)                                                        RMQ3600
480   FORMAT (13A6,A2)                                                          RMQ3610
490   FORMAT ()                                                                 RMQ3620
500   FORMAT (1X,'HEIGHT ABOVE 100M FOR POINT SOURCE  ',I4,' HEIGHT=',F6        RMQ3630
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     1.2,  EMISSIONS=',F10.2)                                          RMQ3640
510   FORMAT ('1'/11X,13A6,A2//1X)                                     RMQ3650
520   FORMAT ('0',T40,'POINT SOURCE INFORMATION'//1X,T8,'SOURCE',T24,'EA RMQ3660
     1ST',T32,'NORTH',T40,'SO2(G/SEC)  PART(G/SEC)  STACK  STACK   STACK RMQ3670
     2   STACK',7X,'SIGNIFICANCE',4X,'EFF'/1X,T24,'COORD',T32,'COORD','  RMQ3680
     3  EMISSIONS   EMISSIONS    HT(M)  TEMP(K) DIAM(M) VEL(M/SEC)  (MIC RMQ3690
     4ROG/M**3)  HT(M)'/1X,T24,'(USER UNITS)'/1X)                      RMQ3700
530   FORMAT (1X,T3,I3,1X,2A6,2X,2F9.2,F10.2,F11.2,1X,4F8.1,6X,6PF11.2,0 RMQ3710
     1PF10.2)                                                          RMQ3720
540   FORMAT (1X,'HEIGHT ABOVE 100M FOR AREA SOURCE  ',I4,' HEIGHT=',F6. RMQ3730
     12,' EMISSIONS=',F10.2)                                           RMQ3740
550   FORMAT ('1'//1X,T20,'AREA SOURCE INFORMATION'//1X,T2,'SOURCE',T9,' RMQ3750
     1EAST',T17,'NORTH',T29,'SO2',T40,'PART',T51,'SIDE',T59,'EFFECTIVE S RMQ3760
     2IGNIFICANCE'/1X,T9,'COORD',T17,'COORD',T26,'EMISSIONS',T39,'EMISSI RMQ3770
     3ONS',T50,'LENGTH',T61,'HEIGHT',T70,'(G/M/SEC)'/1X,T10,'(USER UNITS RMQ3780
     4)',T28,'(GRAMS/M**2/SEC) ',T47,'(USER UNITS) (METERS)'/1X)       RMQ3790
560   FORMAT (1X,T2,I3,2F9.1,1X,2(1X,1PE11.4),2X,0PF6.1,5X,F6.1,2X,1PE11 RMQ3800
     1.4)                                                              RMQ3810
570   FORMAT (' DIMENSIONS TOO SMALL TO HOLD ARRAY ',I3,' BY ',I3)     RMQ3820
580   FORMAT ('0THE ORIGIN IN INTERNAL UNITS IS (',F10.2,',',F10.2,')'/1 RMQ3830
     1X,'THE SIZE OF THE AREA SOURCE ARRAY IS (',I5,',',I5,')')        RMQ3840
590   FORMAT (' SOURCE ',I3,' IS ALREADY LOCATED AT POSITION (',I3,',',I RMQ3850
     13,')   CHECK SOURCE ',I3)                                        RMQ3860
600   FORMAT (' RMIN=',F8.2,' RMAX=',F8.2,' SMIN=',F8.2,' SMAX=',F8.2,  RMQ3870
     1'   (IN INTERNAL UNITS)'//1X)                                    RMQ3880
610   FORMAT (1X,I3,2X,41I3/1X)                                        RMQ3890
620   FORMAT (/6X,41I3/1X)                                             RMQ3900
630   FORMAT ('1',4X,'TOTAL ',A4,' EMISSION AND CUMULATIVE FRACTION ACCO RMQ3910
     1RDING TO HEIGHT'//1X,T12,'TOTAL POINT   CUMULATIVE      TOTAL AREA RMQ3920
     2    CUMULATIVE'/1X,'HEIGHT(M) EMISSIONS(G/S)  FRACTION      EMISSI RMQ3930
     3ONS(G/S)  FRACTION'/1X)                                          RMQ3940
640   FORMAT (1X,T2,I2,' -',I3,T11,F8.2,T26,F7.3,T41,F8.2,T56,F7.3)    RMQ3950
650   FORMAT ('0',T2,'TOTAL',2X,F10.2,T39,F10.2/1X)                    RMQ3960
660   FORMAT ('1',T3,'SIGNIFICANT ',A4,' POINT SOURCES'//1X,T8,'RANK',T2 RMQ3970
     12,'CHI-MAX',T33,'SOURCE NO.'/1X,T17,'(MICROGRAMS/M**3)'/1X)      RMQ3980
670   FORMAT (1X,T9,I3,T18,6PF12.2,T35,I3)                             RMQ3990
680   FORMAT (1X,T9,I3,T18,1PE12.4,T35,I3)                             RMQ4000
690   FORMAT ('0'///1X,T3,'SIGNIFICANT ',A4,' AREA SOURCES'//1X,T8,'RANK RMQ4010
     1',T20,'Q*LENGTH',T33,'SOURCE NO.'/1X,T19,'(G/M/SEC)'/1X)         RMQ4020
700   FORMAT('1',5X,'AREA SOURCE MAP ARRAY (IA)'/1X)                   RMQ4030
710   FORMAT('0',10X,'THIS RUN EXPECTS ',I3,' POINT SOURCES AND ',I3,   RMQ4040
     *' AREA SOURCES.'///)                                             RMQ4050
720   FORMAT (1X,T21,'GENERAL INFORMATION FROM RAMQ, VERSION 78124'//2X, RMQ4060
     X                                                'UNITS - THERE  RMQ4061
     1ARE',F14.7,' USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUA RMQ4070
     2RE SIDE LENGTH (INTERNAL UNIT)'/2X,'CONONE - THERE ARE',F14.7,' KI RMQ4080
     3LOMETERS PER USER UNIT'/2X,'CONTWO - IT IS CALCULATED THAT THERE A RMQ4090
     4RE',F14.7,' KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH RMQ4100
     5 (INTERNAL UNIT)'/2X,'THIS RUN IS FOR ',A6,'SINCE IPOL=',I2//1X)  RMQ4110
C                                                                      RMQ4120
      END                                                              RMQ4130



      BLOCK DATA                                                       BKQU010
C***COEFFICIENTS GENERATED WITH URBAN SIGMAS USING BRSYSZ & BRSZ        BKQU020
C***DISTANCE OF MAX. CONC. FROM PT SOURCE=PXCOF(KST,IH)*H**PXEXP(KST,IH) BKQU030
C***RELATIVE CONC. NORMALIZED FOR WIND SPEED FROM PT SOURCE, CHI*U/Q, =  BKQU040
C***      PXUCOF(KST,IH)*H**PXUEXP(KST,IH)                            BKQU050
C***DISTANCE OF MAX. CONC. FROM DOWNWIND EDGE OF AREA SOURCE =          BKQU060
C***      AXCOF(KST,IH)*H**AXEXP(KST,IH)                              BKQU070
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C***    IH=1 FOR H LESS THAN 20 METERS.                                        BKQU080
C***    IH=2 FOR H FROM 20 TO 30 METERS.                                       BKQU090
C***    IH=3 FOR H FROM 30 TO 50 METERS.                                       BKQU100
C***    IH=4 FOR H FROM 50 TO 70 METERS.                                       BKQU110
C***    IH=5 FOR H FROM 70 TO 100 METERS.                                      BKQU120
C***    IH=6 FOR H FROM 100 TO 200 METERS.                                     BKQU130
C***    IH=7 FOR H FROM 200 TO 300 METERS.                                     BKQU140
C***    IH=8 FOR H FROM 300 TO 500 METERS.                                     BKQU150
C***    IH=9 FOR H GREATER THAN 500 METERS.                                    BKQU160
      COMMON /COEFFU/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),         BKQU170
     *AXCOF(6,9),AXEXP(6,9),HC1(10)                                           BKQU180
      DATA   PXCOF/  .29000E-02,  .29000E-02,  .33389E-02,  .49374E-02,      BKQU190
     *  .76841E-02,  .76841E-02,  .31586E-02,  .31586E-02,  .34293E-02,      BKQU200
     *  .50285E-02,  .65931E-02,  .65931E-02,  .31977E-02,  .31977E-02,      BKQU210
     *  .36114E-02,  .45861E-02,  .51435E-02,  .51435E-02,  .34513E-02,      BKQU220
     *  .34513E-02,  .34298E-02,  .43860E-02,  .33140E-02,  .33140E-02,      BKQU230
     *  .36196E-02,  .36196E-02,  .33575E-02,  .39506E-02,  .19672E-02,      BKQU240
     *  .19672E-02,  .41677E-02,  .41677E-02,  .32748E-02,  .32439E-02,      BKQU250
     *  .63291E-03,  .63291E-03,  .50465E-02,  .50465E-02,  .31556E-02,      BKQU260
     *  .21446E-02,  .19145E-03,  .19145E-03,  .60289E-02,  .60289E-02,      BKQU270
     *  .30537E-02,  .12214E-02,  .12483E-03,  .12483E-03,  .77521E-02,      BKQU280
     *  .77521E-02,  .29817E-02,  .39130E-03,  .11337E-03,  .11337E-03/      BKQU290
      DATA   PXEXP/  .10000E+01,  .10000E+01,  .10205E+01,  .10141E+01,      BKQU300
     *  .10829E+01,  .10829E+01,  .97149E+00,  .97149E+00,  .10116E+01,      BKQU310
     *  .10080E+01,  .11340E+01,  .11340E+01,  .96787E+00,  .96787E+00,      BKQU320
     *  .99634E+00,  .10350E+01,  .12070E+01,  .12070E+01,  .94836E+00,      BKQU330
     *  .94836E+00,  .10095E+01,  .10465E+01,  .13194E+01,  .13194E+01,      BKQU340
     *  .93716E+00,  .93716E+00,  .10145E+01,  .10711E+01,  .14421E+01,      BKQU350
     *  .14421E+01,  .90654E+00,  .90654E+00,  .10200E+01,  .11139E+01,      BKQU360
     *  .16884E+01,  .16884E+01,  .87043E+00,  .87043E+00,  .10270E+01,      BKQU370
     *  .11920E+01,  .19141E+01,  .19141E+01,  .83924E+00,  .83924E+00,      BKQU380
     *  .10327E+01,  .12907E+01,  .19890E+01,  .19890E+01,  .79879E+00,      BKQU390
     *  .79879E+00,  .10365E+01,  .14738E+01,  .20045E+01,  .20045E+01/      BKQU400
      DATA  PXUCOF/  .16808E+00,  .16808E+00,  .20927E+00,  .20378E+00,      BKQU410
     *  .18861E+00,  .18861E+00,  .15945E+00,  .15945E+00,  .20527E+00,      BKQU420
     *  .20229E+00,  .21253E+00,  .21253E+00,  .14777E+00,  .14777E+00,      BKQU430
     *  .19871E+00,  .20011E+00,  .24888E+00,  .24888E+00,  .13262E+00,      BKQU440
     *  .13262E+00,  .18908E+00,  .19685E+00,  .30041E+00,  .30041E+00,      BKQU450
     *  .11745E+00,  .11745E+00,  .17767E+00,  .19301E+00,  .34521E+00,      BKQU460
     *  .34521E+00,  .91943E-01,  .91943E-01,  .15327E+00,  .18499E+00,      BKQU470
     *  .34368E+00,  .34368E+00,  .65533E-01,  .65533E-01,  .11984E+00,      BKQU480
     *  .17445E+00,  .23640E+00,  .23640E+00,  .47345E-01,  .47345E-01,      BKQU490
     *  .89821E-01,  .16720E+00,  .15537E+00,  .15537E+00,  .29993E-01,      BKQU500
     *  .29993E-01,  .56100E-01,  .16747E+00,  .11009E+00,  .11009E+00/      BKQU510
      DATA  PXUEXP/ -.19722E+01, -.19722E+01, -.19896E+01, -.19965E+01,      BKQU520
     * -.20649E+01, -.20649E+01, -.19546E+01, -.19546E+01, -.19831E+01,      BKQU530
     * -.19940E+01, -.21047E+01, -.21047E+01, -.19322E+01, -.19322E+01,      BKQU540
     * -.19736E+01, -.19908E+01, -.21512E+01, -.21512E+01, -.19045E+01,      BKQU550
     * -.19045E+01, -.19609E+01, -.19867E+01, -.21993E+01, -.21993E+01,      BKQU560
     * -.18759E+01, -.18759E+01, -.19462E+01, -.19820E+01, -.22320E+01,      BKQU570
     * -.22320E+01, -.18228E+01, -.18228E+01, -.19142E+01, -.19728E+01,      BKQU580
     * -.22310E+01, -.22310E+01, -.17589E+01, -.17589E+01, -.18677E+01,      BKQU590
     * -.19617E+01, -.21604E+01, -.21604E+01, -.17019E+01, -.17019E+01,      BKQU600
     * -.18172E+01, -.19543E+01, -.20868E+01, -.20868E+01, -.16284E+01,      BKQU610
     * -.16284E+01, -.17414E+01, -.19545E+01, -.20314E+01, -.20314E+01/      BKQU620
      DATA   AXCOF/  .44505E-02,  .44505E-02,  .50000E-02,  .68776E-02,      BKQU630
     *  .10026E-01,  .10026E-01,  .45289E-02,  .45289E-02,  .50000E-02,      BKQU640
     *  .68258E-02,  .76276E-02,  .76276E-02,  .47786E-02,  .47786E-02,      BKQU650
     *  .50000E-02,  .63099E-02,  .51380E-02,  .51380E-02,  .52938E-02,      BKQU660
     *  .52938E-02,  .50000E-02,  .59067E-02,  .29303E-02,  .29303E-02,      BKQU670
     *  .57593E-02,  .57593E-02,  .50000E-02,  .52626E-02,  .16889E-02,      BKQU680
     *  .16889E-02,  .68765E-02,  .68765E-02,  .50000E-02,  .39429E-02,      BKQU690
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     *  .74769E-03,  .74769E-03,  .82988E-02,  .82988E-02,  .50000E-02,  BKQU700
     *  .22800E-02,  .39161E-03,  .39161E-03,  .99556E-02,  .99556E-02,  BKQU710
     *  .50000E-02,  .10882E-02,  .29900E-03,  .29900E-03,  .12206E-01,  BKQU720
     *  .12206E-01,  .50000E-02,  .28165E-03,  .25538E-03,  .25538E-03/  BKQU730
      DATA   AXEXP/  .96437E+00,  .96437E+00,  .10000E+01,  .10199E+01,  BKQU740
     *  .11356E+01,  .11356E+01,  .95855E+00,  .95855E+00,  .10000E+01,  BKQU750
     *  .10224E+01,  .12269E+01,  .12269E+01,  .94276E+00,  .94276E+00,  BKQU760
     *  .10000E+01,  .10455E+01,  .13430E+01,  .13430E+01,  .91659E+00,  BKQU770
     *  .91659E+00,  .10000E+01,  .10624E+01,  .14866E+01,  .14866E+01,  BKQU780
     *  .89676E+00,  .89676E+00,  .10000E+01,  .10896E+01,  .16163E+01,  BKQU790
     *  .16163E+01,  .85826E+00,  .85826E+00,  .10000E+01,  .11523E+01,  BKQU800
     *  .17932E+01,  .17932E+01,  .82277E+00,  .82277E+00,  .10000E+01,  BKQU810
     *  .12557E+01,  .19153E+01,  .19153E+01,  .79086E+00,  .79086E+00,  BKQU820
     *  .10000E+01,  .13853E+01,  .19626E+01,  .19626E+01,  .75807E+00,  BKQU830
     *  .75807E+00,  .10000E+01,  .16028E+01,  .19880E+01,  .19880E+01/  BKQU840
      DATA HC1/10.,20.,30.,50.,70.,100.,200.,300.,500.,1000./           BKQU850
      END                                                               BKQU860


      BLOCK DATA                                                        BQR0010
C***COEFFICIENTS GENERATED WITH RURAL SIGMAS USING PGSYSZ &PGSZ          BQR0020
C***DISTANCE OF MAX. CONC. FROM PT SOURCE=PXCOR(KST,IH)*H**PXEXR(KST,IH) BQR0030
C***RELATIVE CONC. NORMALIZED FOR WIND SPEED FROM PT SOURCE, CHI*U/Q, =  BQR0040
C***      PXUCOR(KST,IH)*H**PXUEXR(KST,IH)                             BQR0050
C***DISTANCE OF MAX. CONC. FROM DOWNWIND EDGE OF AREA SOURCE =           BQR0060
C***      AXCOR(KST,IH)*H**AXEXR(KST,IH)                               BQR0070
C***    IH=1 FOR H LESS THAN 20 METERS.                                 BQR0080
C***    IH=2 FOR H FROM 20 TO 30 METERS.                                BQR0090
C***    IH=3 FOR H FROM 30 TO 50 METERS.                                BQR0100
C***    IH=4 FOR H FROM 50 TO 70 METERS.                                BQR0110
C***    IH=5 FOR H FROM 70 TO 100 METERS.                               BQR0120
C***    IH=6 FOR H FROM 100 TO 200 METERS.                              BQR0130
C***    IH=7 FOR H FROM 200 TO 300 METERS.                              BQR0140
C***    IH=8 FOR H FROM 300 TO 500 METERS.                              BQR0150
C***    IH=9 FOR H GREATER THAN 500 METERS.                             BQR0160
      COMMON /COEFFR/ PXCOR(6,9),PXEXR(6,9),PXUCOR(6,9),PXUEXR(6,9),    BQR0170
     *AXCOR(6,9),AXEXR(6,9),HC1(10)                                     BQR0180
      DATA   PXCOR/  .38964E-02,  .54607E-02,  .75278E-02,  .11563E-01,  BQR0190
     *  .12743E-01,  .21051E-01,  .59088E-02,  .50774E-02,  .74442E-02,  BQR0200
     *  .87095E-02,  .10152E-01,  .10867E-01,  .59366E-02,  .67049E-02,  BQR0210
     *  .76095E-02,  .14437E-01,  .79376E-02,  .10552E-01,  .10739E-01,  BQR0220
     *  .67199E-02,  .75237E-02,  .22618E-02,  .38170E-02,  .13053E-02,  BQR0230
     *  .14425E-01,  .10509E-01,  .75283E-02,  .22489E-02,  .24006E-02,  BQR0240
     *  .79956E-03,  .37139E-01,  .10418E-01,  .75363E-02,  .17287E-02,  BQR0250
     *  .15400E-02,  .14422E-03,  .51107E-01,  .10468E-01,  .75324E-02,  BQR0260
     *  .12670E-02,  .13842E-03,  .43952E-09,  .50921E-01,  .10472E-01,  BQR0270
     *  .75225E-02,  .84890E-03,  .10930E-06,  .13979E-02,  .50996E-01,  BQR0280
     *  .10401E-01,  .74961E-02,  .19441E-03,  .10859E-04,  .20000E+04/  BQR0290
      DATA   PXEXR/  .10995E+01,  .10757E+01,  .10965E+01,  .11383E+01,  BQR0300
     *  .12469E+01,  .12577E+01,  .96054E+00,  .11000E+01,  .11002E+01,  BQR0310
     *  .12329E+01,  .13228E+01,  .14784E+01,  .95916E+00,  .10182E+01,  BQR0320
     *  .10937E+01,  .10843E+01,  .13951E+01,  .14870E+01,  .80763E+00,  BQR0330
     *  .10176E+01,  .10966E+01,  .15582E+01,  .15823E+01,  .20212E+01,  BQR0340
     *  .73818E+00,  .91238E+00,  .10965E+01,  .15595E+01,  .16914E+01,  BQR0350
     *  .21366E+01,  .53282E+00,  .91427E+00,  .10963E+01,  .16166E+01,  BQR0360
     *  .17878E+01,  .25085E+01,  .47257E+00,  .91337E+00,  .10964E+01,  BQR0370
     *  .16753E+01,  .22426E+01,  .49057E+01,  .47321E+00,  .91331E+00,  BQR0380
     *  .10966E+01,  .17455E+01,  .34951E+01,  .22807E+01,  .47297E+00,  BQR0390
     *  .91440E+00,  .10971E+01,  .19827E+01,  .27551E+01,  .00000E+00/  BQR0400
      DATA  PXUCOR/  .10401E+00,  .12133E+00,  .14273E+00,  .15351E+00,  BQR0410
```

```
*  .18855E+00,  .18668E+00,  .77533E-01,  .11728E+00,  .14120E+00,  BQR0420
*  .18239E+00,  .20458E+00,  .34326E+00,  .67228E-01,  .10013E+00,  BQR0430
*  .13963E+00,  .19162E+00,  .38998E+00,  .76271E+00,  .40484E-01,  BQR0440
*  .75308E-01,  .13784E+00,  .54357E+00,  .72550E+00,  .22936E+01,  BQR0450
*  .28539E-01,  .66936E-01,  .13615E+00,  .52790E+00,  .12908E+01,  BQR0460
*  .56943E+01,  .14792E-01,  .65799E-01,  .13315E+00,  .74832E+00,  BQR0470
*  .28818E+01,  .40940E+03,  .12403E-01,  .64321E-01,  .12927E+00,  BQR0480
*  .10826E+01,  .77020E+02,  .23011E+05,  .12340E-01,  .62874E-01,  BQR0490
*  .12546E+00,  .15580E+01,  .68810E+03,  .46522E+06,  .12245E-01,  BQR0500
*  .60615E-01,  .11952E+00,  .22517E+01,  .42842E+03,  .00000E+00/  BQR0510
 DATA  PXUEXR/ -.19460E+01, -.19774E+01, -.20086E+01, -.20742E+01,  BQR0520
* -.21822E+01, -.22176E+01, -.18479E+01, -.19661E+01, -.20050E+01,  BQR0530
* -.21317E+01, -.22094E+01, -.24209E+01, -.18060E+01, -.19196E+01,  BQR0540
* -.20017E+01, -.21462E+01, -.23991E+01, -.26556E+01, -.16763E+01,  BQR0550
* -.18468E+01, -.19984E+01, -.24128E+01, -.25578E+01, -.29371E+01,  BQR0560
* -.15940E+01, -.18191E+01, -.19955E+01, -.24059E+01, -.26934E+01,  BQR0570
* -.31511E+01, -.14513E+01, -.18153E+01, -.19907E+01, -.24817E+01,  BQR0580
* -.28678E+01, -.40795E+01, -.14181E+01, -.18111E+01, -.19851E+01,  BQR0590
* -.25514E+01, -.34879E+01, -.48399E+01, -.14172E+01, -.18071E+01,  BQR0600
* -.19799E+01, -.26152E+01, -.38719E+01, -.53670E+01, -.14160E+01,  BQR0610
* -.18012E+01, -.19721E+01, -.26744E+01, -.37956E+01, -.17020E+02/  BQR0620
 DATA   AXCOR/  .68365E-02,  .79134E-02,  .11062E-01,  .14818E-01,  BQR0630
*  .17234E-01,  .19793E-01,  .92054E-02,  .94211E-02,  .11254E-01,  BQR0640
*  .13875E-01,  .91114E-02,  .65416E-02,  .12311E-01,  .11151E-01,  BQR0650
*  .11079E-01,  .53876E-02,  .48999E-02,  .17087E-02,  .19297E-01,  BQR0660
*  .13824E-01,  .11267E-01,  .42195E-02,  .17526E-02,  .13715E-03,  BQR0670
*  .32619E-01,  .13833E-01,  .11119E-01,  .30122E-02,  .11144E-02,  BQR0680
*  .73510E-06,  .53524E-01,  .13821E-01,  .11115E-01,  .22334E-02,  BQR0690
*  .20868E-04,  .28987E-05,  .55881E-01,  .13920E-01,  .11152E-01,  BQR0700
*  .11204E-02,  .21361E-05,  .20000E+04,  .55160E-01,  .13838E-01,  BQR0710
*  .11153E-01,  .61078E-03,  .10114E-03,  .20000E+04,  .55799E-01,  BQR0720
*  .13881E-01,  .11140E-01,  .61554E-03,  .20000E+04,  .20000E+04/  BQR0730
 DATA   AXEXR/  .10103E+01,  .10748E+01,  .10960E+01,  .12112E+01,  BQR0740
*  .13211E+01,  .14994E+01,  .91095E+00,  .10166E+01,  .10903E+01,  BQR0750
*  .12332E+01,  .15339E+01,  .18689E+01,  .82547E+00,  .96699E+00,  BQR0760
*  .10949E+01,  .15113E+01,  .17163E+01,  .22636E+01,  .71059E+00,  BQR0770
*  .91206E+00,  .10906E+01,  .15738E+01,  .19791E+01,  .29084E+01,  BQR0780
*  .58703E+00,  .91191E+00,  .10937E+01,  .16531E+01,  .20856E+01,  BQR0790
*  .41392E+01,  .47949E+00,  .91210E+00,  .10938E+01,  .17181E+01,  BQR0800
*  .29494E+01,  .38412E+01,  .47136E+00,  .91075E+00,  .10932E+01,  BQR0810
*  .18483E+01,  .33796E+01,  .00000E+00,  .47363E+00,  .91178E+00,  BQR0820
*  .10932E+01,  .19546E+01,  .27033E+01,  .00000E+00,  .47178E+00,  BQR0830
*  .91129E+00,  .10933E+01,  .19534E+01,  .00000E+00,  .00000E+00/  BQR0840
 DATA HC1/10.,20.,30.,50.,70.,100.,200.,300.,500.,1000./           BQR0850
 END                                                               BQR0860
```

```
RAMMETDOC


C  RAMMET READS HOURLY SURFACE MET. OBSERVATIONS FROM THE NATIONAL
C   CLIMATIC CENTER (NCC) FOR ONE YEAR'S DATA, READS MIXING HEIGHT
C   INFORMATION FROM CARDS,  CALCULATES STABILITY CLASS AND
C   RANDOMIZED  FLOW VECTOR, AND WRITES HOURLY MET. DATA ARRAYS
C   IN DAILY RECORDS.


*****CARD INPUT TO RAMMET*****

CARD 1 (I5,I2,1X,2F10.1,F2.0,I4,F10.0) IDC,IYRC,ALAT,ALONG,ZONE,
                NDAYS,RAND(24)
C      IDC       STATION IDENTIFICATION FOR SURFACE OBSERVATION TAPE
C      IYRC      YEAR OF METEOROLOGICAL DATA
C      ALAT      LATITUDE OF SITE
C      ALONG     LONGITUDE OF SITE(POSITIVE FOR WEST LONGITUDE, NEGATIVE FOR EAST
C                 LONGITUDE)
C      ZONE      TIME ZONE OF SITE.(GREENWICH MERIDIAN TIME- LOCAL STANDARD TIME)
C      NDAYS     NUMBER OF DAYS TO BE PROCESSED - SAME AS NUMBER OF DAYS
C                 IN THE YEAR.
C      RAND(24) THE INITIAL RANDOM NUMBER (SEED) USED TO GENERATE THE SEQUENCE OF
C                 RANDOM NUMBERS FOR THE RANDOMIZED FLOW VECTOR. IF THE SAME SEED
C                 IS USED IN DIFFERENT EXECUTIONS OF RAMMET, THE SAME SET OF
C                 RANDOM NUMBERS WILL BE GENERATED FOR THE ENTIRE YEAR. ANY ODD
C                 NUMBER GREATER THAN 3 DIGITS CAN BE USED AS THE SEED.
C                 THE RESULTING RANDOM INTEGERS GENERATED ON THE UNIVAC 1110 FOR
                  USE IN TESTING THIS RUNSTREAM FOR TWO DAYS ARE THE FOLLOWING:
                  0 5 2 7 9 9 1 9 7 6 2 6 2 2 1 0 2 8 2 0 9 3 4 9
                  2 5 0 9 9 4 8 5 3 0 6 8 4 8 9 9 0 3 1 0 0 5 1 6
 EXAMPLE:
9381573 39.9        84.200    05 365 65549.


CARD 2 (12X,F5.0,13X,F5.0) XMNM1,XAFM1
C      XMNM1     YESTERDAY'S MINIMUM MIXING HEIGHT.(METERS)
C      XAFM1     YESTERDAY'S MAXIMUM MIXING HEIGHT.(METERS)
                   YESTERDAY INITIALLY IS THE LAST DAY OF THE PREVIOUS YEAR.
 EXAMPLE:
93815721231  0077               0723


CARD 3 (I5,I2,5X,F5.0,13X,F5.0) IDM,IYM,XMN,XAF
C      IDM       IDENTIFICATION FOR RADIOSONDE STATION USED TO DETERMINE
C                 MIXING HEIGHT. FROM MIX HT CARD.
C      IYM       YEAR FOR MIXING HEIGHT DATA - 2 DIGITS FROM MX HT CARD.
C      XMN       TODAY'S MINIMUM MIXING HEIGHT.(METERS)
C      XAF       TODAY'S MAXIMUM MIXING HEIGHT.(METERS)
                    INITIALLY TODAY IS THE FIRST DAY OF THE YEAR
 EXAMPLE:
93815730101P 0250             P 0155
```

```
CARD 4 AND FOLLOWING (12X,F5.0,13X,F5.0) XMNP1,XAFP1
C      XMNP1     TOMORROW'S MINIMUM MIXING HEIGHT.(METERS)
C      XAFP1     TOMORROW'S MAXIMUM MIXING HEIGHT.(METERS)
                   INITIALLY TOMORROW IS THE SECOND DAY OF THE YEAR
 EXAMPLE:
93815730102  0396                0584

C      INITIALLY  THREE MIXING HEIGHT CARDS ARE READ:
C      FOR YESTERDAY, TODAY, AND TOMORROW. IN THE LOOP FOR DAYS AFTER
C      INTERPOLATING MIXING HEIGHTS, MIXING HEIGHTS FOR TODAY AND TOMORROW ARE
C      SHIFTED AND NEW MIXING HEIGHTS FOR NEXT DAY'S TOMORROW READ IN.
C
C      A TOTAL OF THE NUMBER OF DAYS IN THE YEAR PLUS TWO(DEC 31 OF YEAR BEFORE,
C      AND JAN 1 OF YEAR AFTER) MIXING HEIGHT CARDS ARE EXPECTED AS INPUT TO
C      RAMMET.
C
C
C*****     TAPE OR DISK INPUT OF SURFACE METEOROLOGICAL DATA *****
C
C      A FULL YEARS' HOURLY SURFACE OBSERVATIONS(24* NUMBER OF DAYS IN THE YEAR)
C      ARE EXPECTED IN CARD DECK 144 FORMAT FROM THE NATIONAL CLIMATIC CENTER ON
C     UNIT 8. NO DATA CAN BE MISSING.


FORMAT OF EACH CARD IMAGE RECORD - (I5,4I2,3A1,22X,2I2,4X,I3,29X,A1)
          ID,IYEAR,IMONTH,IDAY,IHOUR,ICEIL,IDIR,ISPEED,ITEMP,ICOVER

C      ID        SURFACE METEOROLOGICAL STATION IDENTIFICATION - FROM
C                 MET DATA.
C      IYEAR     YEAR FOR SURFACE DATA - 2 DIGITS. FROM MET DATA
C      IMONTH    MONTH
C      IDAY      DAY
C      IHOUR     HOUR
C                DATA FROM THE NATIONAL CLIMATIC CENTER(NCC) ARE LABELED WITH
C                HOURS 00 TO 23 FOR OBSERVATIONS FROM MIDNIGHT TO 2300. IN RAMMET
C                AND ITS OUTPUT, HOURS 01 TO 24 REPRESENT OBSERVATIONS FROM 0100
C                TO MIDNIGHT.
C      ICEIL     INPUT CEILING(HUNDREDS OF FEET)
C                SINCE MINUS SIGNS(11-PUNCHES) REPRESENT SPECIAL CODING ON CARD
C                IMAGE DATA FROM NCC, ICEIL AND ICOVER ARE READ IN ALPHA FORMAT
C                AND CONVERTED IN RAMMET.
C      IDIR      INPUT WIND DIRECTION (10'S OF DEGREES, THAT IS, 27 = 270 DEGREES)
C      ISPEED    INPUT WIND SPEED.(KNOTS)
C      ITEMP     INPUT TEMPERATURE.(DEG-F)
C      ICOVER    OPAQUE CLOUD COVER.(TENTHS)


EXAMPLE:
9381573010100120                          0507    021                                  -
93815730101010708000080000000000262009070629190230200 55--7070                        -
93815730101020405800080000000000234010041029110240200 55-6004047070-                  -
93815730101030145800060000100000215012030929060250220 58-6201440045-                  -
93815730101040115800050000000030196012031229000260220 55-7K01130032-                  -
9381573010105011 8000400001000301770160209289502902505 8-4----6K011-                  -
9381573010106010-00000900010000016301836142891027024069---010                         -
9381573010107006-00000400030000016501936122891022021088---006                         -
9381573010108004-00000700020000014102036162885028026072---004                         -
9381573010109003-00000400030000013202001182882026024078---003                         -
9381573010110004-00000700020000012602001182880023022088---004                         -
9381573010111004-00000700020000012002034182878023022088---004                         -
9381573010112004-00000700020000011502134142877023023092---004                         -
```

```
9381573010113008800001700010000009002234142870024024092--K008                -
9381573010114017800002700010000008002232102867024024092--3017                -
9381573010115015800001000010000008302331122868026025088--3015                -
9381573010116008 5800090001000000900242813287002602609 2-3----5K00882K010-   -
9381573010117015580003000010000009802027092872024023085-6301543040-          -
9381573010118888250007000000000010301826062873023022081637 J039888600---600---5
9381573010119---1000080000000000110015221028750200190813388800---300---300---0
9381573010120---1000080000000000114014201228760170170882288800---200---200---0
9381573010121090800007000000000011501521152877021020078--7090                -
9381573010122070800015000000000011801621152878024022071--7070                -
9381573010123---2000150000000000118014211528780250220632270700---200---200---2
9381573010200035800012000000000011101520162876025022066--3035                -
9381573010201035800012000000000011101621172876026023066--3035                -
9381573010202033800012000000000010901621162875027024063--3033                -
9381573010203---2000120000000000107015201728750260230632230250 0---200---200---2
9381573010204---2000120000000000108014201728750230210681130150 0---100---100---1
9381573010205---0000120000000000105014211828740220200710 03   00---000---000---0
9381573010206---0000120000000000107014211828740230210680 00---00---000---000---0
9381573010207---1000120000000000109015201828750230210713388880 0---300---300---0
9381573010208---0000100000000000118016201828780240220710 07   00---000---000---0
9381573010209---2000120000000000125017201628790250230721171400 0---100---100---1
9381573010210---2000120000000000128020201628810270250751171400 0---100---100---1
9381573010211---2100120000000000131021201828820290270723171402 9888300---300---1
9381573010212---2400150000000000128022211628810310280696171405 9888600---600---2
9381573010213120800015000000000012002420162879035031064--7120                -
9381573010214---2200150000000000115026201828780360320674171203 9888400---400---3
9381573010215120550010000000000011002820162876040035062967120 39888900---900---9
9381573010216120580010000000000010902820182876041036060-871202 9888-00----00---9
9381573010217120550007000000000011002719182876040035060867120 29888800---800---6
9381573010218---4000070000000000106028181728760410360606698880 0---600---600---2
9381573010219---1000070000000000105029181628750410360623398880 0---300---300---1
9381573010220---2000070000000000105029181628750400360653398880 0---300---300---3
9381573010221---2000080000000000009502919222872039035067449888 00---400---400---4
9381573010222---0000120000000000094029202028720420370600 00---00---000---000---0
9381573010223---0000120000000000094029191828720420370600 00---00---000---000---0
                    .                   .                   .
                    .                   .                   .
                    .                   .                   .
9381573123123017800002700010000008002232102867024024092--3017                -
9381574010100004-0000070002000001150213414287702302309 2---004               -
```

*****DISK OUTPUT FROM RAMMET*****

THE OUTPUT MET DATA IS WRITTEN IN UNFORMATTED FORTRAN RECORDS TO UNIT 9.
THE RAM VERSIONS WILL READ MET DATA DIRECTLY FROM THIS FILE OR FROM CARDS,
WHICHEVER IS SPECIFIED BY THE USER.

*****EXAMPLE ECL STREAM*****

IN THIS EXAMPLE RUNSTREAM THE FILE, S9381573, IS A DISK FILE
CONTAINING HOURLY SURFACE MET OBSERVATIONS IN THE CARD FORMAT RECEIVED FROM
THE NATIONAL CLIMATIC CENTER IN ASHEVILLE, NC. THE FILE, METDATA, WILL
CONTAIN THE PROCESSED MET DATA WHICH IS OUTPUT FROM RAMMET.
THE UPPER AIR DATA WHICH IS INPUT ON CARDS IS USED IN
CONJUNCTION WITH THE SURFACE DATA TO CREATE THE PROPER MET INPUT INTO RAM.

```
@RUN,D/R JOBNAME/9,ACCNT-NO/USERID,PROJ-ID,2,70
@PASSWD PASSWORD
@ASG,A S9381573.                          . NCC FORMATTED SFC MET DATA
@USE 8,S9381573.
```

```
@ASG,CP METDATA.                                        RAMMET OUTPUT FILE
@USE 9,METDATA.
@XQT A999*UNAMAP.RAMMET
9381573 39.9          84.200    05 365 65549.
93815721231  0077                  0723
93815730101P 0250                 P 0155
93815730102  0396                    0584
93815730103  042214.708.8            037610.307.5
93815730104  110812.006.7            110809.806.9
93815730105  011605.605.6            024306.506.2
        .       .       .
        .       .       .
        .       .       .
93815731228  086602.802.7            081806.504.4
93815731229  031609.304.6            046712.308.2
93815731230P 130113.805.4            085411.309.8
93815731231  048302.701.4           M 0854
93815740101  048302.701.4           M 0854
C
C*************************************************************************
C
C      THE PRECEEDING RUN STREAM HAD A RUN TIME OF 1 MINUTE AND 58 SECONDS
C   ON THE UNIVAC 1111 AND REQUIRED 10-K WORDS OF MEMORY(APPROXIMATELY 5,706
C   WORDS OF INSTRUCTIONS AND 3,206 WORDS OF DATA)
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*                                   *
*    EXAMPLE PRINTOUT FROM RAMMET   *
*                                   *
*************************************

RAMMET - VERSION 78124


 STATION NUMBER=93815      YEAR OF DATA=73
LATITUDE=       39.9  LONGITUDE=       84.2  ZONE=  5.
NUMBER OF DAYS IN YEAR=365  RANDOM SEED=     65549.
1973 SURFACE DATA AT STATION 93815          1973 MIXING WEIGHT DATA AT STATION 93815
IYEAR=73 IMONTH= 1 DAY= 1 JULIAN DAY=    1. SUNRISE=  8.061  SUNSET= 17.278
KST= 5    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    5    5    4    4    4    4    4
SPEED=   3.1  5.1  4.6  6.2  4.6  7.2  6.2  8.2  9.3  9.3  9.3  7.2  7.2  5.1  6.2  6.7  4.6  3.1  5.1  6.2  7.7  7.7  7.7  8.2
TEMP=268. 269. 269. 270. 271. 270. 268. 271. 270. 268. 268. 268. 269. 269. 270. 270. 269. 268. 266. 265. 267. 269. 269. 269.
AFV= 250. 220. 210. 210. 200. 180. 180. 180. 190. 190. 160. 160. 160. 140. 130. 100.  90.  80.  40.  20.  30.  30.  30.  20.
FVR=246. 221. 208. 213. 205. 185. 177. 185. 193. 192. 158. 162. 158. 138. 127.  96.  88.  84.  38.  16.  35.  29.  30.  25.
HLH1= 511.  484.  457.  429.  402.  374.  347.  319.  292.  265.  237.  210.
      182.  155.  155.  155.  155.  170.  191.  211.  232.  253.  273.  294.
HLH2= 250.  484.  457.  429.  402.  374.  347.  319.  292.  265.  237.  210.
      182.  155.  155.  155.  155.  181.  217.  211.  232.  253.  273.  294.
IYEAR=73 IMONTH= 1 DAY= 2 JULIAN DAY=    2. SUNRISE=  8.063  SUNSET= 17.291
KST= 4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4
SPEED=   8.7  8.2  8.7  8.7  9.3  9.3  9.3  9.3  8.2  8.2  9.3  8.2  8.2  9.3  8.2  9.3  9.3  8.7  8.2  8.2 11.3 10.3  9.3 10.3
TEMP=270. 270. 270. 268. 268. 268. 268. 269. 269. 270. 271. 273. 275. 275. 278. 278. 278. 278. 278. 278. 277. 279. 279. 277.
AFV=  30.  30.  20.  20.  30.  30.  20.  20.  20.  20.  20.  30.  20.  20.  20.  20.  10. 360. 360. 360.  10.  20.  10.  20.
FVR= 28.  31.  16.  25.  35.  30.  24.  21.  19.  16.  22.  34.  20.  24.  25.  25.   6. 359. 357. 356.   6.  21.   7.  22.
HLH1= 315.  335.  356.  377.  398.  418.  439.  460.  480.  501.  522.  543.
      563.  584.  584.  584.  584.  577.  567.  557.  547.  537.  527.  517.
HLH2= 315.  335.  356.  377.  398.  418.  439.  460.  480.  501.  522.  543.
                .                           .                           .
                .                           .                           .
                .                           .                           .
IYEAR=73 IMONTH=12 DAY=31 JULIAN DAY= 365. SUNRISE=  8.058  SUNSET= 17.263
KST= 6    6    7    7    7    7    7    6    5    4    3    2    2    2    3    4    4    5    5    5    4    4    4    4
SPEED=   2.6  2.6  1.5  1.5  1.0  1.5  1.5  2.1  2.1  1.5  2.1  1.5  1.0  1.5  3.1  2.6  2.1  2.6  3.1  3.1  3.6  3.6  4.6  4.6
TEMP=273. 272. 271. 271. 270. 270. 270. 269. 272. 273. 275. 276. 277. 279. 279. 278. 277. 275. 275. 276. 276. 276. 275. 275.
AFV= 110. 100.  70. 100. 100.  50.  40.  40. 150. 150. 250. 260. 260. 200. 230. 220. 240. 210. 240. 270. 290. 280. 280. 280.
FVR=113.  99.  66.  97.  98.  50.  40.  38. 152. 154. 254. 264. 258. 199. 232. 221. 237. 214. 242. 270. 291. 285. 280. 284.
HLH1= 854.  854.  854.  854.  854.  854.  854.  854.  135.  279.  423.  567.
      710.  854.  854.  854.  854.  854.  854.  854.  854.  854.  854.  854.
HLH2= 483.  483.  483.  483.  483.  483.  483.  483.  542.  604.  667.  729.
      792.  854.  854.  854.  854.  813.  758.  703.  854.  854.  854.  854.
ALL RECORDS HAVE BEEN PROCESSED
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C***RAMMET-PREPROCESSOR- WRITTEN BY JOAN HRENKO NOVAK                          MET0010
C*** BASED ON METHODS SUGGESTED BY TURNER , ZIMMERMAN, AND IRWIN.              MET0020
C*** VERSION 78124                                                            MET0030
C***RAMMET ASSUMES THERE IS NO MISSING DATA ON THE MET. TAPE.                  MET0040
C***IF MISSING DATA IS DETECTED, THE LOCATION OF THE MISSING DATA IS           MET0050
C***PRINTED. MISSING DATA MUST BE FILLED IN BEFORE PROCEEDING .               MET0060
      DIMENSION LSTAB(12,7), IDFAC(12,2), ANGL(3), ICEIL(3), IDG(3), IDI      MET0070
     1G(11)                                                                   MET0080
      DIMENSION KST(24), SPEED(24), TEMP(24), AFV(24), FVR(24), HLH(2,24      MET0090
     1), RAND(24)                                                             MET0100
      DATA IDIG /'0','1','2','3','4','5','6','7','8','9','-'/                MET0110
      DATA IREC /1/ ,IMO /1/ ,ANGL /60.,35.,15./ ,CONST /57.29578/            MET0120
      DATA IDFAC /0,31,59,90,120,151,181,212,243,273,304,334,0,31,60,91,      MET0130
     1121,152,182,213,244,274,305,335/                                        MET0140
      DATA LSTAB /7,7,7,6,6,6,5,5,5,5,4,4,6,6,6,5,5,5,4,4,4,4,4,4,4,4,4,     MET0150
     14,4,4,4,4,4,4,4,4,3,3,3,4,4,4,4,4,4,4,4,4,2,2,2,3,3,3,3,3,3,4,4,4,    MET0160
     21,2,2,2,2,2,2,3,3,3,3,4,1,1,1,1,1,2,2,2,2,3,3,3/                       MET0170
C***    UNIT 8 = SURFACE DATA                                                 MET0180
C***    UNIT 9 = OUTPUT FILE                                                  MET0190
C***    UNIT 5 = UPPER AIR DATA IN CARD FORMAT                                MET0200
      IN=5                                                                    MET0210
      IO=6                                                                    MET0220
      IFLAG=0                                                                 MET0230
C***READ CARD TO INITIALIZE MET TAPE ID,YEAR,LATITUDE,LONGITUDE,              MET0240
C*** TIME ZONE ,NO. OF DAYS IN YEAR, INITIAL RANDOM NUMBER.                   MET0250
C***RAND(24) IS THE INITIAL RANDOM NO. USED TO GENERATE THE SEQUENCE OF       MET0260
C***NUMBERS FOR THE RANDOMIZED FLOW VECTOR. IF THE SAME NO. IS USED IN        MET0270
C***DIFFERENT EXECUTIONS OF THE PREPROCESSOR, THE SAME SET OF RANDOM NOS      MET0280
C***WILL BE GENERATED. ANY ODD NUMBER GREATER THAN 3 DIGITS CAN BE USED       MET0290
C***AS THE SEED. THIS SEED IS MULTIPLIED BY 10,000 INTERNALLY.                MET0300
C***ZONE IS GMT-LST.                                                          MET0310
      READ (IN,400) IDC,IYRC,ALAT,ALONG,ZONE,NDAYS,RAND(24)                   MET0320
      WRITE (IO,410) IDC,IYRC,ALAT,ALONG,ZONE,NDAYS,RAND(24)                  MET0330
      DUM=ALAT/CONST                                                          MET0340
      SINLAT=SIN(DUM)                                                         MET0350
      COSLAT=COS(DUM)                                                         MET0360
      DUM=ALONG/15.-ZONE                                                      MET0370
      TEMPZ=15.*ZONE-ALONG                                                    MET0380
C***RESET SUBSRIPT IF LEAP YEAR                                               MET0390
      LYS=1                                                                   MET0400
      IF (NDAYS.EQ.366) LYS=2                                                 MET0410
C***READ MET DATA                                                             MET0420
C***THIS READ ASSUMES AN INPUT TAPE WITH HOURLY DATA FROM THE                 MET0430
C***NATIONAL CLIMATIC CENTER, ASHVILLE, NC. IN THEIR STANDARD                 MET0440
C***HOURLY CARD FORMAT.                                                       MET0450
C***SKIP 00 HOUR OF MET DATA.                                                 MET0460
      READ (8,420) ID,IYEAR,IMONTH,IDAY,IHOUR,ICEIL,IDIR,ISPEED,ITEMP,IC      MET0470
     1OVER                                                                    MET0480
      LWD=IDIR                                                                MET0490
C***BEGIN PROCESSING WITH HOUR 01                                             MET0500
      READ (8,420) ID,IYEAR,IMONTH,IDAY,IHOUR,ICEIL,IDIR,ISPEED,ITEMP,IC      MET0510
     1OVER                                                                    MET0520
C***MIXING HEIGHT VALUES ARE DETERMINED TWICE A DAY FROM RADIOSONDE DATA      MET0530
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C***USING THE PROCEDURES OF HOLZWORTH.                                  MET0540
C***READ PRIOR DAYS MIXING HEIGHT VALUES                                MET0550
      READ (IN,430) XMNM1.XAFM1                                         MET0560
C***PRESENT DAY                                                         MET0570
      READ (IN,440) IDM,IYM,XMN,XAF                                     MET0580
C***WRITE IDENTIFYING INFORMATION ON OUTPUT FILE                        MET0590
      WRITE (9) ID,IYEAR,IDM,IYM                                        MET0600
      WRITE (IO,450) IYEAR,ID,IYM,IDM                                   MET0610
C*** READ NEXT DAY'S MIXING HEIGHT VALUES                               MET0620
      READ (IN,430) XMNP1,XAFP1                                         MET0630
C***START DAY LOOP.                                                     MET0640
      DO 380 IDY=1,NDAYS                                                MET0650
C***CALCULATE THE DAY NO AND THE TIME OF SUNRISE AND SUNSET             MET0660
      DAY1=IDAY+IDFAC(IMONTH,LYS)                                       MET0670
C***CONSTANT 0.0172028=360./365.242*57.29578                            MET0680
C***DETERMINE THE ANGULAR(RADIANS) FRACTION OF A YEAR FOR THIS DATE.    MET0690
      DAYNO=(DAY1-1.0)*0.0172028                                        MET0700
      TDAYNO=2.*DAYNO                                                   MET0710
      SIND=SIN(DAYNO)                                                   MET0720
      COSD=COS(DAYNO)                                                   MET0730
      SINTD=SIN(TDAYNO)                                                 MET0740
      COSTD=COS(TDAYNO)                                                 MET0750
C***ACCOUNT FOR ELLIPTICITY OF EARTH'S ORBIT.                           MET0760
      SIGMA=279.9348+(DAYNO*CONST)+1.914827*SIND-0.079525*COSD+0.019938* MET0770
     1SINTD-0.00162*COSTD                                               MET0780
C***CONSTANT 0.39785=SIN(.4091720193=23.44383/57.29578)                 MET0790
C***FIND THE SINE OF THE SOLAR DECLINATION.                             MET0800
      DSIN=0.39785*SIN(SIGMA/CONST)                                     MET0810
      DCOS=SQRT(1.0-DSIN*DSIN)                                          MET0820
C***DETERMINE TIME(HRS) OF MERIDIAN PASSAGE                             MET0830
      AMM=12.0+0.12357*SIND-0.004289*COSD+0.153809*SINTD+0.060783*COSTD MET0840
      HCOS=(-SINLAT*DSIN)/(COSLAT*DCOS)                                 MET0850
C***DETERMINE SOLAR HOUR ANGLE OF SUNRISE-SUNSET.                       MET0860
      H2=(ATAN2(SQRT(1.-HCOS*HCOS),HCOS)/15.0)*CONST                    MET0870
C***TIME OF SUNRISE(TSR) AND TIME OF SUNSET(TSS) ARE EXPRESSED IN       MET0880
C***LOCAL STANDARD TIME SINCE THE ZONE CORRECTION HAS ALREADY BEEN MADE. MET0890
C***OTHERWISE THEY WOULD BE IN GREENWICH MEAN TIME.                     MET0900
      TSR=AMM-H2+DUM                                                    MET0910
      TSS=AMM+H2+DUM                                                    MET0920
      RAND(1)=RAND(24)*100000.                                          MET0930
C***THIS CALL TO THE UNIVAC RANDOM NO. GENERATOR PROVIDES 24 UNIFORMLY  MET0940
C***DISTRIBUTED NUMBERS BETWEEN 0 AND 1.                                MET0950
C***IF THIS ROUTINE IS NOT RUN ON A UNIVAC MACHINE, THE RANDOM NO.      MET0960
C***GENERATOR FOR THE USER'S SYSTEM MAY BE SUBSTITUTED.                 MET0970
      CALL RANDU (RAND,24)                                              MET0980
C***START HOUR LOOP                                                     MET0990
      DO 370 KHR=1,24                                                   MET1000
      KHRC=KHR                                                          MET1010
C***INITIALIZE STABILITY BEFORE IT IS CALCULATED                        MET1020
      KST(KHR)=0                                                        MET1030
      IF (KHR.EQ.24) GO TO 70                                           MET1040
C***CHECK DATA FOR CORRECTNESS & CONTINUITY                             MET1050
C***CHECK STATION NUMBER.                                               MET1060
      IF (ID.EQ.IDC) GO TO 10                                           MET1070
      WRITE (IO,460) IREC,ID,IDC                                        MET1080
      WRITE (IO,510)                                                    MET1090
      CALL EXIT                                                         MET1100
C***CHECK YEAR.                                                         MET1110
10    IF (IYEAR.EQ.IYRC) GO TO 20                                       MET1120
      WRITE (IO,470) IYEAR,IYRC,IREC                                    MET1130
      WRITE (IO,510)                                                    MET1140
      CALL EXIT                                                         MET1150
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C***CHECK MONTH                                                        MET1160
20    IF (IMONTH.EQ.IMO) GO TO 40                                      MET1170
      IF (IMONTH.EQ.(IMO+1)) GO TO 30                                  MET1180
      WRITE (IO,480) IMONTH,IMO,IREC                                   MET1190
C***                                                                   MET1200
      WRITE (IO,510)                                                   MET1210
      CALL EXIT                                                        MET1220
30    IMO=IMONTH                                                       MET1230
C***CHECK DAY                                                          MET1240
40    IF (IFIX(DAY1).EQ.IDY) GO TO 50                                  MET1250
      WRITE (IO,490) DAY1,IDY,IREC                                     MET1260
      WRITE (IO,510)                                                   MET1270
      CALL EXIT                                                        MET1280
C***CHECK HOUR                                                         MET1290
50    IF (IHOUR.EQ.KHRC) GO TO 80                                      MET1300
      WRITE (IO,500) IHOUR,KHR,IREC                                    MET1310
      WRITE (IO,510)                                                   MET1320
      GO TO 370                                                        MET1330
60    WRITE (IO,520) KHR,IREC,IHOUR                                    MET1340
      CALL EXIT                                                        MET1350
70    IF (IHOUR.NE.0) GO TO 60                                         MET1360
      KHRC=IHOUR                                                       MET1370
C***UPDATE MIXING HEIGHTS- STARTING NEW DAY.                           MET1380
      XMNM1=XMN                                                        MET1390
      XAFM1=XAF                                                        MET1400
      XMN=XMNP1                                                        MET1410
      XAF=XAFP1                                                        MET1420
C***READ NEXT DAYS MIXING HEIGHTS.                                     MET1430
      READ (IN,430,END=80) XMNP1,XAFP1                                 MET1440
80    DO 90 JK=1,11                                                    MET1450
      IF (ICOVER.EQ.IDIG(JK)) GO TO 100                                MET1460
90    CONTINUE                                                         MET1470
      JK=11                                                            MET1480
      WRITE (IO,530) ICOVER                                            MET1490
100   ISKY=JK-1                                                        MET1500
      IF (ICEIL(1).NE.IDIG(11)) GO TO 110                              MET1510
      IDG(1)=9                                                         MET1520
      IDG(2)=9                                                         MET1530
      IDG(3)=8                                                         MET1540
      GO TO 150                                                        MET1550
110   DO 140 JI=1,3                                                    MET1560
      DO 120 JK=1,10                                                   MET1570
      IF (ICEIL(JI).EQ.IDIG(JK)) GO TO 130                             MET1580
120   CONTINUE                                                         MET1590
130   IDG(JI)=JK-1                                                     MET1600
140   CONTINUE                                                         MET1610
150   IROOF=IDG(1)*100+IDG(2)*10+IDG(3)                                MET1620
C***IROOF IS CEILING HEIGHT IN HUNDREDS OF FEET.                       MET1630
C***CONVERT TEMP FROM FAHRENHEIT TO KELVIN                             MET1640
      TEMP(KHR)=0.5556*(ITEMP-32.)+273.15                              MET1650
C***CONVERT WIND SPEED FROM KNOTS TO METERS/SEC                        MET1660
      S=ISPEED*0.51444                                                 MET1670
C***WIND SPEED IS SET TO 1 METER/SEC                                   MET1680
      IF (S.LT.1.0) S=1.0                                              MET1690
      SPEED(KHR)=S                                                     MET1700
C***CHECK FOR CALMS                                                    MET1710
      IF (IDIR.EQ.0) GO TO 160                                         MET1720
C***WIND DIRECTION IS ASSUMED TO BE THE SAME AS FOR THE LAST HOUR      MET1730
C***IF THE WIND DIRECTION IS REPORTED AS "CALM".                       MET1740
      LWD=IDIR                                                         MET1750
      GO TO 170                                                        MET1760
160   IDIR=LWD                                                         MET1770
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170   XDIR=IDIR*10.                                                    MET1780
C***CALCULATE FLOW VECTOR AND RANDOM FLOW VECTOR                       MET1790
      IF (XDIR.GT.180.) GO TO 180                                      MET1800
      FV=XDIR+180.                                                     MET1810
      GO TO 190                                                        MET1820
180   FV=XDIR-180.                                                     MET1830
190   AFV(KHR)=FV                                                      MET1840
      IRAND=RAND(KHR)*10.                                              MET1850
C***IRAND IS SINGLE DIGIT FROM 0 TO 9.                                 MET1860
      FVR(KHR)=FV+IRAND-4.0                                            MET1870
      IF (FVR(KHR).GT.360.) FVR(KHR)=FVR(KHR)-360.                     MET1880
C***DETERMINE RADIATION INDEX.                                         MET1890
      IF (ISKY.EQ.10.AND.IROOF.LT.70) GO TO 200                        MET1900
      IF (IHOUR.GT.TSR.AND.IHOUR.LT.TSS) GO TO 210                     MET1910
      IRADX=2                                                          MET1920
      IF (ISKY.LE.4) IRADX=1                                           MET1930
      GO TO 280                                                        MET1940
200   IRADX=3                                                          MET1950
      GO TO 280                                                        MET1960
C***DETERMINE THE ANGLE OF ELEVATION                                   MET1970
C***DETERMINE SOLAR HOUR ANGLE(RADIANS)                                MET1980
210   HI=(15.*(KHRC-AMM)+TEMPZ)/CONST                                  MET1990
      ALFSN=SINLAT*DSIN+DCOS*COSLAT*COS(HI)                            MET2000
C***DETERMINE SOLAR ELEVATION ANGLE(DEG).                              MET2010
      ALF=ATAN2(ALFSN,SQRT(1.-ALFSN*ALFSN))*CONST                      MET2020
      DO 220 I=1,3                                                     MET2030
220   IF (ALF.GT.ANGL(I)) GO TO 230                                    MET2040
      I=4                                                              MET2050
230   ICN=5-I                                                          MET2060
      IF (ISKY.GT.5) GO TO 240                                         MET2070
      IRADX=ICN+3                                                      MET2080
      GO TO 280                                                        MET2090
240   IRADX=ICN-1                                                      MET2100
      IF (IROOF.LT.70) GO TO 250                                       MET2110
      IF (IROOF.LT.160) GO TO 260                                      MET2120
      IF (ISKY.EQ.10) GO TO 270                                        MET2130
      IRADX=ICN                                                        MET2140
      GO TO 270                                                        MET2150
250   IRADX=ICN-2                                                      MET2160
      GO TO 270                                                        MET2170
260   IF (ISKY.EQ.10) IRADX=IRADX-1                                    MET2180
270   IF (IRADX.LT.1) IRADX=1                                          MET2190
      IRADX=IRADX+3                                                    MET2200
280   IND=ISPEED                                                       MET2210
      IF (ISPEED.GT.12) IND=12                                         MET2220
      IF (ISPEED.LE.1) IND=1                                           MET2230
C***DETERMINE STABILITY.                                               MET2240
      KST(KHR)=LSTAB(IND,IRADX)                                        MET2250
C***DO NOT ALLOW STABILITY TO VARY RAPIDLY                             MET2260
      IF (IDY.EQ.1.AND.KHR.EQ.1) LST=KST(KHR)                          MET2270
      IF ((KST(KHR)-LST).GT.1) KST(KHR)=LST+1                          MET2280
      IF ((LST-KST(KHR)).GT.1) KST(KHR)=LST-1                          MET2290
      LST=KST(KHR)                                                     MET2300
      IF (KST(KHR).LT.1) WRITE (IO,540) KST(KHR),IND,IRADX,IREC        MET2310
C***CALCULATE MIXING HEIGHT                                            MET2320
      IHR=KHRC                                                         MET2330
      XHR=IHR                                                          MET2340
      IF (IHR.GT.14.AND.XHR.LE.TSS) GO TO 300                          MET2350
      IND=2                                                            MET2360
      IF (XHR.LE.TSS) GO TO 310                                        MET2370
      IF (KST(KHR).EQ.4) GO TO 290                                     MET2380
      HLH(2,KHR)=XAF+(XMNP1-XAF)*((XHR-TSS)/(24.-TSS))                 MET2390
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      IND=1                                                                  MET2400
290   HLH(IND,KHR)=XAF+(XAFP1-XAF)*((XHR-TSS)/(38.-TSS))                     MET2410
      IF (IND.EQ.2) HLH(1,KHR)=HLH(2,KHR)                                    MET2420
      GO TO 360                                                              MET2430
300   HLH(1,KHR)=XAF                                                         MET2440
      HLH(2,KHR)=XAF                                                         MET2450
      GO TO 360                                                              MET2460
310   IF (XHR.GT.TSR) GO TO 330                                              MET2470
      KSTSP=KST(KHR)                                                         MET2480
      IF (KST(KHR).EQ.4) GO TO 320                                           MET2490
      HLH(2,KHR)=XMN                                                         MET2500
      IND=1                                                                  MET2510
320   HLH(IND,KHR)=XAFM1+(XAF-XAFM1)*((24.-TSS+XHR)/(24.-TSS+14.))           MET2520
      IF (IND.EQ.2) HLH(1,KHR)=HLH(2,KHR)                                    MET2530
      GO TO 360                                                              MET2540
330   IF (KSTSP.EQ.4) GO TO 350                                              MET2550
      HLH(2,KHR)=XMN+(XAF-XMN)*((XHR-TSR)/(14.-TSR))                         MET2560
      HLH(1,KHR)=XAF*(XHR-TSR)/(14.-TSR)                                     MET2570
      GO TO 360                                                              MET2580
340   IFLAG=1                                                                MET2590
      IHOUR=0                                                                MET2600
      GO TO 370                                                              MET2610
350   HLH(1,KHR)=XAFM1+(XAF-XAFM1)*((24.-TSS+XHR)/(24.-TSS+14.))             MET2620
      HLH(2,KHR)=HLH(1,KHR)                                                  MET2630
C***READ NEXT HOUR'S MET DATA                                                MET2640
360   IF (IFLAG.EQ.1) GO TO 390                                              MET2650
C***STORE CORRECT MONTH AND DAY FOR DAILY PRINTOUT, SINCE 24TH HOUR LABE     MET2660
      IF(KHR.NE.23) GO TO 365                                                MET2670
      LMON=IMONTH                                                            MET2680
      LDAY=IDAY                                                              MET2690
365   READ (8,420,END=340) ID,IYEAR,IMONTH,IDAY,IHOUR,ICEIL,IDIR,ISPEED,     MET2700
     1ITEMP,ICOVER                                                           MET2710
      IREC=IREC+1                                                            MET2720
C***END OF HOUR LOOP.                                                        MET2730
370   CONTINUE                                                               MET2740
C***WRITE DAYS CALCULATION ON TO FILE                                        MET2750
C***EACH ARRAY CONTAINS THE COMPLETE INFORMATION FOR ONE DAY ORDERED         MET2760
C***SEQUENTIALLY FROM HOUR 01 THRU 24                                        MET2770
      WRITE (9) IYEAR,LMON,DAY1,KST,SPEED,TEMP,AFV,FVR,HLH                   MET2780
      WRITE (IO,550) IYEAR,LMON,LDAY,DAY1,TSR,TSS                            MET2790
      WRITE (IO,560) KST                                                     MET2800
      WRITE (IO,570) SPEED,TEMP,AFV,FVR,((HLH(I,J),J=1,24),I=1,2)            MET2810
C***END OF DAY LOOP.                                                         MET2820
380   CONTINUE                                                               MET2830
390   WRITE (9) IYEAR,LMON,DAY1,KST,SPEED,TEMP,AFV,FVR,HLH                   MET2840
      WRITE (IO,550) IYEAR,LMON,LDAY,DAY1,TSR,TSS                            MET2850
      WRITE (IO,560) KST                                                     MET2860
      WRITE (IO,570) SPEED,TEMP,AFV,FVR,((HLH(I,J),J=1,24),I=1,2)            MET2870
      WRITE (IO,580)                                                         MET2880
      CALL EXIT                                                              MET2890
C                                                                            MET2900
400   FORMAT (I5,I2,1X,2F10.1,F2.0,I4,F10.0)                                 MET2910
410   FORMAT('1','   RAMMET - VERSION 78124'/1X,                            MET2911
     *' STATION NUMBER=',I5,5X,'YEAR OF DATA=',I2/1X,                        MET2920
     *'LATITUDE=',F10.1,'  LONGITUDE=',F10.1,'  ZONE=',F4.0/1X,              MET2930
     *'NUMBER OF DAYS IN YEAR=',I3,'  RANDOM SEED=',F10.0)                   MET2940
420   FORMAT (I5,4I2,3A1,22X,2I2,4X,I3,29X,A1)                               MET2950
430   FORMAT (12X,F5.0,13X,F5.0)                                             MET2960
440   FORMAT (I5,I2,5X,F5.0,13X,F5.0)                                        MET2970
450   FORMAT (1X,'19',I2,' SURFACE DATA AT STATION ',I5,10X,'19',I2,' MI     MET2980
     1XING HEIGHT DATA AT STATION ',I5)                                      MET2990
460   FORMAT (' ID DOES NOT MATCH IN RECORD   ',I4,'  ID ON TAPE IS ',I5     MET3000
```

```
     *,' ID REQUESTED IS ',I5)                                                  MET3010
470   FORMAT (' YEAR IS',I3,' INSTEAD OF ',I2,' IREC=',I4)                      MET3020
480   FORMAT (' MONTH ',I2,' DOES NOT AGREE WITH LOOP ',I2,' IREC=',I4)         MET3030
490   FORMAT (' DAY ',F4.0,' DOES NOT AGREE WITH LOOP ',I2,' IREC=',I4)         MET3040
500   FORMAT (' HOUR ',I2,' DOES NOT AGREE WITH LOOP ',I2,' IREC=',I4)          MET3050
510   FORMAT (' *****DATA IS MISSING. PLEASE CORRECT INPUT FILE*****')          MET3060
520   FORMAT (' ERROR: MISSING HOUR LOOP VALUE= ',I3,' WHILE VALUE ','ON        MET3070
     1 RECORD ',I7,' IS = ',I3)                                                 MET3080
530   FORMAT (' THE CHARACTER ',A1,' IS NOT ALLOWABLE.',' CLOUD COVER DE        MET3090
     1FAULTS TO 10.')                                                           MET3100
540   FORMAT (' STABILITY=',4I4)                                                MET3110
550   FORMAT (' IYEAR=',I2,' IMONTH=',I2,' DAY=',I2,' JULIAN DAY=',             MET3120
     *F5.0,' SUNRISE=',F7.3,'  SUNSET=',F7.3)                                   MET3130
560   FORMAT (' KST= ',24(I1,4X))                                               MET3140
570   FORMAT (' SPEED=  ',24(F4.1,1X)/' TEMP=',24(F4.0,1X)/' AFV= ',24(F        MET3150
     14.0,1X)/' FVR=',24(F4.0,1X)/' HLH1=',12(F5.0,1X)/6X,12(F5.0,1X)/'        MET3160
     2HLH2=',12(F5.0,1X)/6X,12(F5.0,1X))                                        MET3170
580   FORMAT (' ALL RECORDS HAVE BEEN PROCESSED')                               MET3180
C                                                                               MET3190
      END                                                                       MET3200
```

5. RAM - INPUT FORMATS AND EXAMPLE RUNSTEAMS

```
RAMDOC

C***RAM IS AN EFFICIENT GAUSSIAN-PLUME MULTIPLE-SOURCE
C***AIR QUALITY ALGORITHM. RAM IS DESCRIBED IN: NOVAK,J.H., AND
C***TURNER,D.B., 1976: AIR POLLUTION CONTROL ASSOC. J., VOL. 26, NO. 6,
C***PAGES 570-575(JUNE 1976). RAM'S PRINCIPAL USE IS TO DETERMINE
C***SHORT TERM(ONE-HOUR TO ONE-DAY) CONCENTRATIONS FROM POINT AND
C***AREA SOURCES IN URBAN AREAS.(RAMR FOR RURAL AREAS)

C***THREE SYSTEMS OF LENGTH AND COORDINATES ARE USED IN RAM:
C*** THE FIRST SYSTEM, USER UNITS, IS SELECTED BY THE USER AND
C***  NORMALLY USES THE COORDINATE SYSTEM OF THE EMISSION INVENTORY.
C***  ALL LOCATIONS INPUT BY THE USER(SUCH AS SOURCES AND RECEPTORS)
C***  ARE IN THIS SYSTEM. ALSO AS A CONVENIENCE TO THE USER ALL
C***  LOCATIONS ON OUTPUT ARE ALSO IN THIS SYSTEM.
C*** THE SECOND SYSTEM, INTERNAL UNITS, IS USED INTERNALLY IN RAM
C***  FOR COORDINATE LOCATIONS AND DISTANCES. ONE INTERNAL UNIT IS THE
C***  SIDE LENGTH OF THE SMALLEST AREA SOURCE SQUARE. THIS LENGTH MUST
C***  BE IDENTIFIED AND SPECIFIED BY THE USER. THE PURPOSE OF USING
C***  INTERNAL UNITS IS TO HAVE A CORRESPONDENCE BETWEEN LOCATION(GRID
C***  COORDINATES) AND PARTICULAR AREA SOURCE POSITIONS. THIS IS
C***  ACCOMPLISHED THROUGH THE USE OF THE AREA SOURCE MAP ARRAY(IA ARRAY
C***  ). THIS ALLOWS DETERMINATION AS TO WITHIN WHICH AREA SOURCE ANY
C***  COORDINATE POINT RESIDES.
C*** THE THIRD SYSTEM,X,Y, IS AN UPWIND, CROSSWIND COORDINATE SYSTEM
C***  WITH REFERENCE TO EACH RECEPTOR. THE X-AXIS IS DIRECTED UPWIND
C***  (SAME AS WIND DIRECTION FOR THE PERIOD). IN ORDER TO DETERMINE
C***  DISPERSION PARAMETER VALUES AND EVALUATE EQUATIONS FOR
C***  CONCENTRATIONS, DISTANCES IN THIS SYSTEM MUST BE IN KILOMETERS.
C***

*****     CARD INPUT TO RAM (OR RAMR)  *****

CARD 1 (13A6,A2)    LINE1      80 CHARACTER TITLE
 EXAMPLE:
 RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV, EPA(1 JAN 78)


CARD 2 (13A6,A2)    LINE2      80 ALPHA CHARACTERS OF INFORMATION
 EXAMPLE:
 EMISSIONS: TEST CITY, 1973


CARD 3 (13A6,A2)    LINE3      80 ALPHA CHARACTERS OF INFORMATION
 EXAMPLE:
 SFC MET DATA: TEST CITY 1973; UPPER AIR: TEST CITY  1973.


CARD 4 (FREE FORMAT) IOPT,NPER,NAVG,Z,HAFL,NSIGP,NSIGA,IDATE,IHSTRT
   IOPT - OPTIONS (THIRTEEN DIFFERENT ONES) CODED: 1= USE OPTION, 0= DON'T USE.
   IOPT(1)  POINT SOURCE INPUT?
   IOPT(2)  AREA  SOURCE INPUT?
   IOPT(3)  ENTERING PERMANENT RECEPTOR COORDINATES?
```

```
IOPT(4)  SIGNIFICANT POINT RECEPTORS GENERATED?
IOPT(5)  SIGNIFICANT AREA  RECEPTORS GENERATED?
IOPT(6)  HONEYCOMB RECEPTORS GENERATED?
IOPT(7)  HOURLY OUTPUT?
IOPT(8)  PARTIAL CONCENTRATIONS WRITTEN TO DISK?
       THE PARTIAL CONCENTRATION FILE IS A RECORD OF THE CONTRIBUTION
       OF EACH SOURCE TO EACH RECEPTOR FOR EACH HOUR.
       SEE PARTC FOR DESCRIPTION OF FILE FORMAT.
IOPT(9)  PRINT HOURLY SUMMARIES RATHER THAN FULL HOURLY OUTPUT?
       THIS OPTION SHOULD BE USED  ONLY IF OPTION 7 IS REQUESTED.
       THE EFFECT IS TO REDUCE THE AMOUNT OF PRINTOUT FROM 3 OR MORE
       PAGES/HOUR TO 1 PAGE/HOUR BY ELIMINATING OUTPUT OF SOURCE-
       RECEPTOR CONTRIBUTION TABLES.
IOPT(10) PUNCH CONCENTRATIONS ON CARDS FOR EXTERNAL USE (SUCH AS PLOTTING)
       ONE CARD IS PUNCHED FOR EACH RECEPTOR FOR EACH AVERAGING PERIOD.
       IT CONTAINS RECEPTOR COORDINATES IN USER UNITS, TOTAL CONCENTRATION,
       THE CONTRIBUTION FROM AREA SOURCES, AND THE CONTRIBUTION FROM POINT
       SOURCES(MICROGRAMS/M**3).SEE PUNCHCARD FOR DESCRIPTION OF OUTPUT FORMAT
IOPT(11) INPUT METEOROLOGICAL DATA ON CARDS?
IOPT(12) SPECIFY SIGNIFICANT SOURCES?
       RAM INTERNALLY DETERMINES THE ORDER OF SIGNIFICANCE FOR BOTH POINT AND
       AREA SOURCES. THE USER SHOULD EMPLOY OPTION 12 ONLY IF THERE IS A
       PARTICULAR SOURCE OF INTEREST WHICH WAS NOT CONSIDERED TO BE
       SIGNIFICANT BY RAM(I.E. IS NOT INCLUDED ON THE PRINTOUT). IF THE USER
       WISHES TO ADD A SIGNIF. POINT SOURCE BUT NOT A SIGNIFICANT AREA SOURCE,
       BOTH CARD TYPE 6 AND 9 MUST BE INCLUDED IF BOTH POINT AND AREA SOURCES
       ARE BEING CONSIDERED AND INAS SHOULD BE SET TO 0.

IOPT(13) READ HOURLY EMISSIONS?
NPER     THE NUMBER OF PERIODS TO BE RUN
NAVG     THE NUMBER OF HOURS IN THE AVERAGING TIME(PERIOD)
       IF THE AVERAGING TIME IS 24 HOURS, NPER IS EQUIVALENT TO THE NUMBER OF
       DAYS TO BE RUN.
Z        RECEPTOR HEIGHT ABOVE GROUND (METERS) (ALL MUST BE AT SAME HEIGHT).
HAFL     POLLUTANT HALF-LIFE (SECONDS).
NSIGP    NO. OF SIGNIFICANT POINT SOURCE(MAX=25), MAY BE LESS THAN IN RAMQ
NSIGA    NO. OF SIGNIFICANT AREA SOURCES(MAX=10), MAY BE LESS THAN IN RAMQ
IDATE(1) 2 DIGIT YEAR
IDATE(2) STARTING JULIAN DAY FOR THIS RUN
IHSTRT   STARTING HOUR FOR THIS RUN

      RESTRICTIONS ON INPUT PARAMETERS FOR RAM

      1) IF METEOROLOGICAL DATA HAS BEEN PREPROCESSED USING RAMMET OR THE
       CRSTER PREPROCESSOR:
        (A) THE STARTING HOUR(IHSTRT) MUST EQUAL 1.
        (B) THE STARTING JULIAN DAY(IDATE(2)) MUST BE BETWEEN 1 AND 366.
            THE MET. FILE WILL AUTOMATICALLY BE POSITIONED TO THE CORRECT DAY
        (C) IF MULTIPLE DAYS ARE TO BE RUN, THE AVERAGING TIME(NAVG) MAY BE
            1,2,3,4,6,8,12, OR 24. FOR OTHER AVERAGING TIMES<=24, THE TOTAL
            NUMBER OF HOURS RUN(NAVG*NPER) MUST NOT EXCEED 24.
        (D) NON-CONSECUTIVE DAYS OR PERIODS MUST BE RUN SEPARATELY.

      2) IF METEOROLOGICAL DATA IS TO BE INPUT ON CARDS:
        (A) THE STARTING HOUR(IHSTRT) MAY RANGE BETWEEN 1 AND 24 INCLUSIVELY.
        (B) THE STARTING JULIAN DAY(IDATE(2)) MUST AGREE WITH THE DATE ON THE
            FIRST INPUT CARD. NO FILE MANIPULATION IS DONE.
        (C) THE AVERAGING TIME(NAVG) MAY ALSO RANGE BETWEEN 1 AND 24.
        (D) NON-CONSECUTIVE DAYS OR PERIODS CAN BE PROCESSED IN THE SAME RUN.
            HOURS WITHIN A PERIOD MUST BE CONSECUTIVE AND EACH PERIOD MUST
            HAVE THE SAME AVERAGING TIME.
```

EXAMPLE:
1,1,1,1,1,1,1,1,0,1,1,1,1, 1, 2, 0.0, 14400., 5, 10, 73, 001,1

CARD TYPE 5 (FREE FORMAT) ISFCD,ISFCYR,IMXD,IMXYR
THIS CARD IS REQUIRED ONLY IF IOPT(11)=0

ISFCD — SURFACE METEOROLOGICAL STATION IDENTIFICATION.

ISFCYR — YEAR OF SURFACE DATA - 2 DIGITS.

IMXD — IDENTIFICATION OF RADIOSONDE STATION USED TO DETERMINE MIXING HEIGHT.

IMXYR — YEAR OF MIXING HEIGHT DATA - 2 DIGITS.

EXAMPLE:
93815, 73, 93815, 73

CARD TYPE 6 (2613) INPT,MPS
THIS CARD IS REQUIRED ONLY IF IOPT(1)=1 AND IOPT(12)=1

INPT — THE NUMBER OF USER SPECIFIED SIGNIFICANT POINT SOURCES, COUNT(MAX=25)

MPS — POINT SOURCE NUMBERS USER WANTS TO CONSIDER SIGNIFICANT(I.E., CONC. CONTRIBUTIONS FROM SIGNIF. SOURCES ARE PRINTED ON OUTPUT)

EXAMPLE:
1 7

CARD TYPE 7 (FREE FORMAT) FH,XLIM,NHTS,(HINT(I),I=1,NHTS)
THIS CARD IS REQUIRED ONLY IF IOPT(2)=1

FH — FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGHT

XLIM — DISTANCE LIMIT ON INTEGRATION FOR AREA SOURCE(USER UNITS). IN ORDER FOR CALCULATED CONCENTRATIONS FROM AREA SOURCES TO BE DETERMINED CORRECTLY, XLIM SHOULD BE EQUIVALENT TO THE GREATEST DISTANCE FROM ANY RECEPTOR(INCLUDING THOSE GENERATED BY THE ALGORITHM) TO ANY PART OF AN AREA SOURCE. IF RECEPTORS ARE OUTSIDE THE AREA SOURCE REGION, XLIM WILL BE THE DISTANCE FROM THE RECEPTOR FARTHEST FROM THE AREA SOURCE REGION ACROSS THE AREA SOURCE TO THE CORNER FARTHEST AWAY FROM THE RECEPTOR. IF ALL RECEPTORS ARE INSIDE THE AREA SOURCE REGION, XLIM IS THE GREATEST POSSIBLE DISTANCE FROM A RECEPTOR TO A CORNER OF THE AREA SOURCE REGION. XLIM IS ENTERED IN USER UNITS. IF XLIM IS TOO SHORT THE CALCULATED CONCENTRATIONS WILL BE TOO LOW. IF XLIM IS TOO LARGE COMPUTATION TIME IS INCREASED. XLIM CANNOT EXCEED 116 KM.

NHTS — INTEGER NUMBER OF HEIGHTS TO BE USED FOR AREA SOURCES(MIN=1,MAX=3)

HINT — HEIGHT(S) (METERS) FOR AREA SOURCE INTEGRATIONS. THIS IS AN ARRAY OF FROM ONE TO THREE ELEMENTS.

EXAMPLE:
.75, 25., 3, 11.,15.,20.

CARD TYPE 8 (FREE FORMAT) (BPH(I),I=1,NBP)
THIS CARD IS REQUIRED ONLY WHEN CARD TYPE 7 IS USED

BPH — BREAKPOINT HEIGHTS (METERS) BETWEEN AREA SOURCE HEIGHTS. THESE VALUES DEFINE THE BOUNDS OF HEIGHTS CLASSES. ANY AREA SOURCE FALLING WITHIN THE HEIGHT CLASS WILL USE THE SPECIFIED REPRESENTATIVE HEIGHT(HINT) FOR THAT CLASS DURING THE INTEGRATION. BPH IS AN ARRAY OF TWO ELEMENTS. ONE VALUE WILL BE READ IF NHTS ON PREVIOUS CARD IS 1 OR 2. TWO VALUES READ FOR NHTS = 3. BPH AND HINT CAN USUALLY BE CHOSEN BY EXAMINING THE QUANTITY OF AREA SOURCE EMISSIONS WITH HEIGHT WHICH IS GIVEN AS PART OF THE RAMQ OUTPUT. IT IS DESIRABLE TO CHOOSE AS REPRESENTATIVE HEIGHTS FROM AREA SOURCES AS POSSIBLE.IF NHTS IS 1, THE VALUE OF BPH MUST BE LARGER THAN ANY AREA HEIGHT IN THE DATA SET FOR THE RUN.

```
EXAMPLE:
13., 17.


CARD TYPE 9 (2613) INAS,MAS
     THIS CARD IS REQUIRED ONLY IF IOPT(2)=1 AND IOPT(12)=1
 INAS       THE NUMBER OF USER SPECIFIED SIGNIFICANT AREA SOURCES, COUNT(MAX=10)
 MAS        AREA SOURCE NUMBERS USER WANTS TO CONSIDER SIGNIFICANT(I.E. CONC.
             CONTRIBUTIONS FROM SIGNIF. SOURCES ARE PRINTED ON OUTPUT)

EXAMPLE:
  0


CARD TYPE 10  (2A4,2F10.3) (RNAME(J,NRECEP),J=1,2),RREC(NRECEP),SREC(NRECEP)
      ONE CARD FOR EACH INPUT RECEPTOR; LAST RECEPTOR CARD MUST BE BLANK.
      REQUIRED ONLY IF IOPT(3)=1


  RNAME    ALPHA-NUMERIC STATION IDENTIFIER (8 CHARACTERS).
  RREC     EAST COORDINATE OF RECEPTOR (USER UNITS).
  SREC     NORTH COORDINATE OF RECEPTOR (USER UNITS).
      NOTE : THE SUM OF RREC AND SREC EQUAL TO ZERO IS USED TO TRANSFER
       CONTROL SIGNALING THAT THE LAST RECEPTOR CARD HAS BEEN READ.
       A COORDINATE SCHEME SHOULD BE SELECTED PRIOR TO RUNNING RAMQ SO THAT ALL
       SOURCES AND RECEPTORS HAVE POSITIVE EAST(R) AND NORTH(S) COORDINATES.
 EXAMPLE:
RECEP 1    566.00    4405.0


CARD TYPE 11 (FREE FORMAT) GRIDSP,HRMIN,HRMAX,HSMIN,HSMAX
  THIS CARD IS REQUIRED ONLY IF IOPT(6)=1
  HONEYCOMB BOUNDARIES (HONEYCOMB RECEPTORS WILL BE GENERATED ONLY FOR
  THE AREA DEFINED BY THESE BOUNDS)
   NOTE, IF BOUNDARY VARIABLES ARE INPUT AS ZERO BOUNDARIES WILL BE THE SAME AS
   THE AREA SOURCE REGION. HOWEVER IF NO AREA SOURCES ARE INPUT AND IF
    HONEYCOMB RECEPTORS ARE TO BE GENERATED, THIS CARD MUST BE INCLUDED
    TO PROVIDE THE BOUNDS FOR RECEPTOR GENERATION.
  GRIDSP   GRID SPACING (DISTANCE BETWEEN) FOR HONEYCOMB RECEPTORS (USER UNITS).
  HRMIN    MINIMUM EAST  COORDINATE (USER UNITS).
  HRMAX    MAXIMUM EAST  COORDINATE (USER UNITS).
  HSMIN    MINIMUM NORTH COORDINATE (USER UNITS).
  HSMAX    MAXIMUM NORTH COORDINATE (USER UNITS).
 EXAMPLE:
 2.0, 570., 578., 4400., 4408.


CARD TYPE 12 (FREE FORMAT) JYR,DAY1,JHR,IKST(JHR),QU(JHR),QTEMP(JHR),
          QTHETA(JHR),QHL(JHR)
     THESE CARDS CONTAIN HOURLY SURFACE METEOROLOGICAL OBSERVATIONS AND ARE
     REQUIRED ONLY IF IOP(11)=1. THERE SHOULD BE A CARD FOR EACH HOUR TO BE
     MODELED. IF IOPT(11)=0 THE MET DATA IS ASSUMED TO COME FROM RAMMET.
  JYR            YEAR OF MET. DATA
  DAY1           JULIAN DAY OF MET. DATA
  JHR            HOUR OF MET. DATA
  IKST(JHR)      STABILITY CLASS FOR THE JHR-TH HOUR
  QU(JHR)        WIND SPEED(M/SEC) FOR THE JHR-TH HOUR
  QTEMP(JHR)     AMBIENT AIR TEMPERATURE(DEG-KELVIN) FOR THE JHR-TH HOUR
  QTHETA(JHR)    WIND DIR.(DEG) FOR JHR-TH HOUR(FROM WHICH THE WIND IS BLOWING)
  QHL(JHR)       MIXING HEIGHT(METERS) FOR THE JHR-TH HOUR
EXAMPLE:
73,1,1,4,6.17,269.82,33.0,429.11
```

**********POSSIBLE DISK OR TAPE INPUT TO RAM *****

1) ANNUAL OR AVERAGE EMISSION DATA IS REQUIRED FOR THE EXECUTION OF RAM. THE MODEL EXPECTS THESE EMISSIONS ON UNIT 9 IN THE FORMAT AS OUTPUT FROM THE EMISSIONS PREPROCESSOR, RAMQ. SEE RAMQDOC FOR A DESCRIPTION OF THE INPUT DATA FORMAT.

2) HOURLY METEOROLOGICAL DATA CAN BE INPUT VIA CARDS AS DESCRIBED ABOVE, OR CAN BE INPUT FROM DISK/TAPE ON UNIT 11 IN THE FORMAT AS OUTPUT FROM THE MET. PREPROCESSOR, RAMMET. THIS OUTPUT FORMAT IS EXACTLY THE SAME AS THE OUTPUT FILE FROM THE MX24SP(ALSO CRSTER) PREPROCESSORS. THE ONLY DIFFERENCE BETWEEN THE RAMMET PREPROCESSOR AND THE CRSTER PREPROCESSOR IS THE GENERATED RANDOM NUMBERS. SEE RAMMETDOC FOR A DESCRIPTION OF THE INPUT DATA FORMAT.

3) HOURLY POINT SOURCE EMISSION DATA CAN BE INPUT FROM DISK OR TAPE ON UNIT 15. RAM EXPECTS EMISSIONS, ONE RECORD FOR EACH HOUR, AS FORTRAN WRITTEN UNFORMATTED RECORDS CONTAINING THE FOLLOWING DATA:

VARIABLE	DESCRIPTION
IDATP	DATE(YYDDDHH) WHERE YY=YEAR,DDD=JULIAN DAY, HH=HOUR
SOURCE(IPOL,I),I=1,NPT	THE HOUR'S POINT SOURCE EMISSIONS(GRAMS/SECOND) FOR EACH OF THE POINT SOURCES IN THE ORDER IN WHICH THEY WERE INPUT INTO RAMQ.(IPOL HERE IS THE POLLUTANT TYPE AS SPECIFIED AS INPUT TO RAMQ, 3=SO2, 4=PARTICULATE)

4) HOURLY AREA SOURCE EMISSION DATA CAN BE INPUT FROM DISK OR TAPE ON UNIT 16. RAM EXPECTS EMISSIONS, ONE RECORD FOR EACH HOUR, AS FORTRAN WRITTEN UNFORMATTED RECORDS CONTAINING THE FOLLOWING DATA:

VARIABLE	DESCRIPTION
IDATA	DATE(YYDDDHH) WHERE YY=YEAR,DDD=JULIAN DAY, HH=HOUR
ASORC(IPOL,I),I=1,NAS	THE HOUR'S AREA EMISSIONS(GRAMS/SECOND) FOR EACH OF THE AREA SOURCES IN THE ORDER IN WHICH THEY WERE INPUT INTO RAMQ.

NOTE: IT IS ASSUMED THAT THE USER WILL SUPPLY HIS OWN SOFTWARE TO PRODUCE THE HOURLY EMISSION FILES COMPATIBLE WITH THIS FORMAT.

*****POSSIBLE DISK AND PUNCHCARD OUTPUT FROM RAM*****

1) CONTRIBUTIONS (MICROGRAMS/M**3) FROM EACH SOURCE TO EACH RECEPTOR ARE WRITTEN TO A FILE(UNIT 10) EACH HOUR IF PARTIAL CONCENTRATION OUTPUT IS REQUESTED(IOPT(8)=1). RECEPTOR LOCATIONS ARE ALSO RECORDED EACH HOUR SINCE THEY WILL CHANGE WITH AVERAGE WIND DIRECTION IF GENERATED. SEE PARTC FOR FILE FORMAT.

2) PUNCH CARDS CONTAINING POINT AND AREA TOTAL CONCENTRATIONS AT EACH RECEPTOR FOR THE PERIOD BEING MODELED MAY BE GENERATED. SEE PUNCHCARD FOR FORMAT.

```
C**************************************************************************
C
```

THE FOLLOWING ECL IS NEEDED TO EXECUTE RAM USING THE URBAN SIGMAS. THE PREPROCESSED EMISSION FILE, REFERRED TO AS RAMQOUT IN THE EXAMPLE , MUST CONTAIN THE PREPROCESSOR OUTPUT FROM RAMQ WHICH SPECIFIED THE USE OF URBAN SIGMAS.

THE METEOROLOGICAL DATA CAN BE INPUT EITHER FROM DISK OR CARDS. THE EXAMPLE ECL DEMONSTRATES MET DATA INPUT FROM CARDS IN FREE FORMAT (PARAMETERS MAY BE SEPARATED BY COMMAS OR BLANKS).

```
     THE HOURLY EMISSION DATA CAN BE INPUT FROM DISK OR TAPE.
THE EXAMPLE ECL DEMONSTRATES HOURLY EMISSIONS INPUT FROM DISK.
     TO FACILITATE CHECKING TEST RUNS AGAINST EXAMPLE OUTPUTS GIVEN IN THE
USERS GUIDE, THE HOURLY EMISSIONS DATA USED WITH THIS TEST RUN WAS
THE SAME AS THE AVERAGE EMISSION RATE(INPUT TO RAMQ) FOR EACH HOUR.

*****EXAMPLE ECL STREAM*****

@RUN,D/R JOBNAME/40,ACCNT-NO/USERID,PROJ-ID,1,50/60
@PASSWD PASSWORD
@ASG,A RAMQOUT.                          . INPUT EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,A PARTCON.                          . PARTIAL CONCENTRATION OUTPUT FILE
@USE 10,PARTCON.
@ASG,A RAMHPOINT.                        . HOURLY POINT EMISSION INPUT FILE
@USE 15,RAMHPOINT.
@ASG,A RAMHAREA.                         . HOURLY AREA EMISSION INPUT FILE
@USE 16,RAMHAREA.
@XQT A999*UNAMAP.RAM
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., APB, REGION XV, EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET DATA: TEST CITY 1973; UPPER AIR: TEST CITY  1973
1,1,1,1,1,1,1,1,0,1,1,1,1, 1, 2, 0.0, 14400., 5, 10, 73, 001,1
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    566.00    4405.0
RECEP 2    564.5     4401.5

 2.0, 570., 578., 4400., 4408.
73,1,1,4,6.17,269.82,33.0,429.11
73,1,2,4,4.63,271.48,23.0,401.7
C
C*************************************************************************
C
C  THE PRECEEDING RUN STREAM HAD A RUN TIME OF 16.65 SECONDS
C  ON THE UNIVAC 1110 AND REQUIRED 39-K WORDS OF MEMORY
C  (APPROXIMATELY 11,511 WORDS FOR INSTRUCTIONS AND 26,959 WORDS FOR DATA)
```

RAM-OUTPUT EXAMPLE

Figures 3 through 5 show the spatial relations of the 12 point sources, the 15 area sources, and the 41 receptors used in the example problem. This emission information is used in the example run-stream for RAMQ on page 20. The run-stream for RAM for this example is given on the previous page (p. 56).

Figure 3 shows the locations of the 12 point sources P-1 to P-12 in relation to the area source region (dashed lines). Also shown in this figure are the 10 receptors (numbers 3-12) generated downwind of the 5 significant point sources (sources 7, 5, 8, 9, and 11).

Figure 4 shows the locations of the 15 area sources (A-1 through A-15) and the 10 receptors (13 through 22) generated downwind of significant area sources.

Figure 5 shows the locations of the 2 input receptors (1 and 2) and the 19 honeycomb receptors (23 through 41). Note that, because of the existence of receptors 5, 6, 7, 8, 9, and 10 due to significant points and receptors 13, 14, 15, 16, and 19 due to significant areas, a number of the receptors that might be in a regular pattern of honeycomb receptors are not required. Each prospective candidate position for a honeycomb receptor is examined to see if it is within one-half the spacing between honeycomb receptors of an already existing receptor. If it is within this distance, the candidate position is not used.

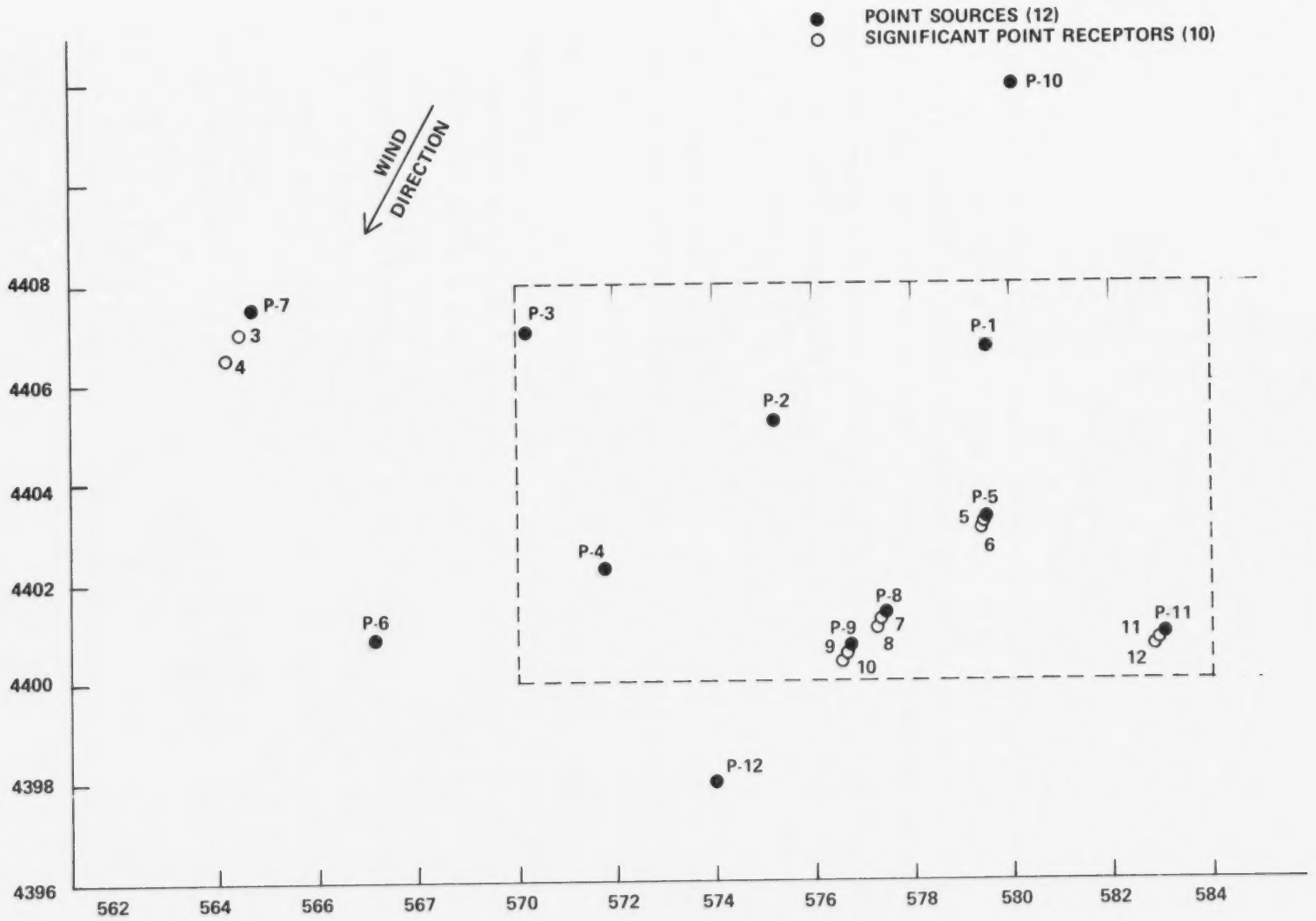

Figure 3. Locations of point sources and significant point receptors for example problem.

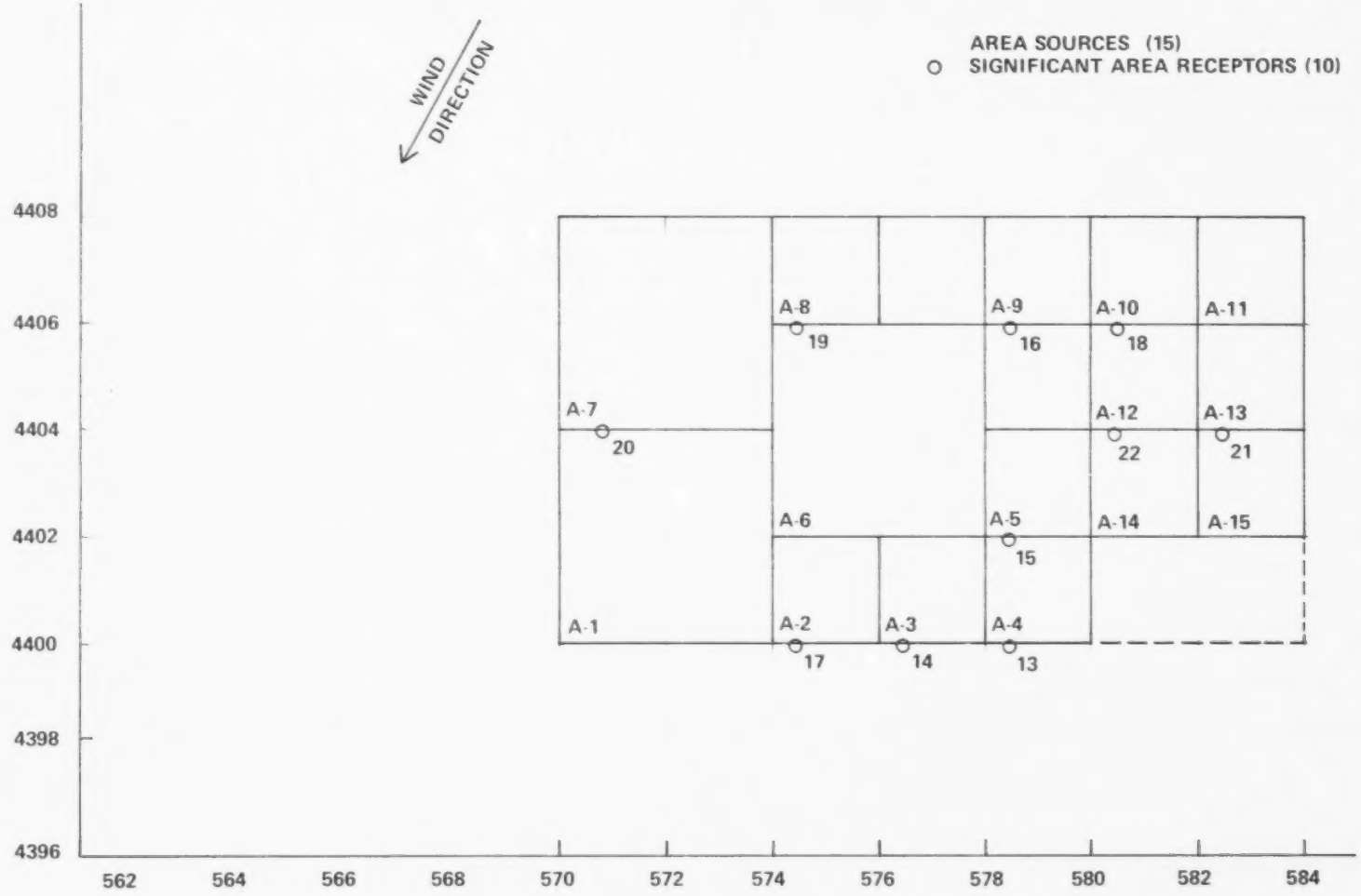

Figure 4. Locations of area sources and significant area receptors for example problem.

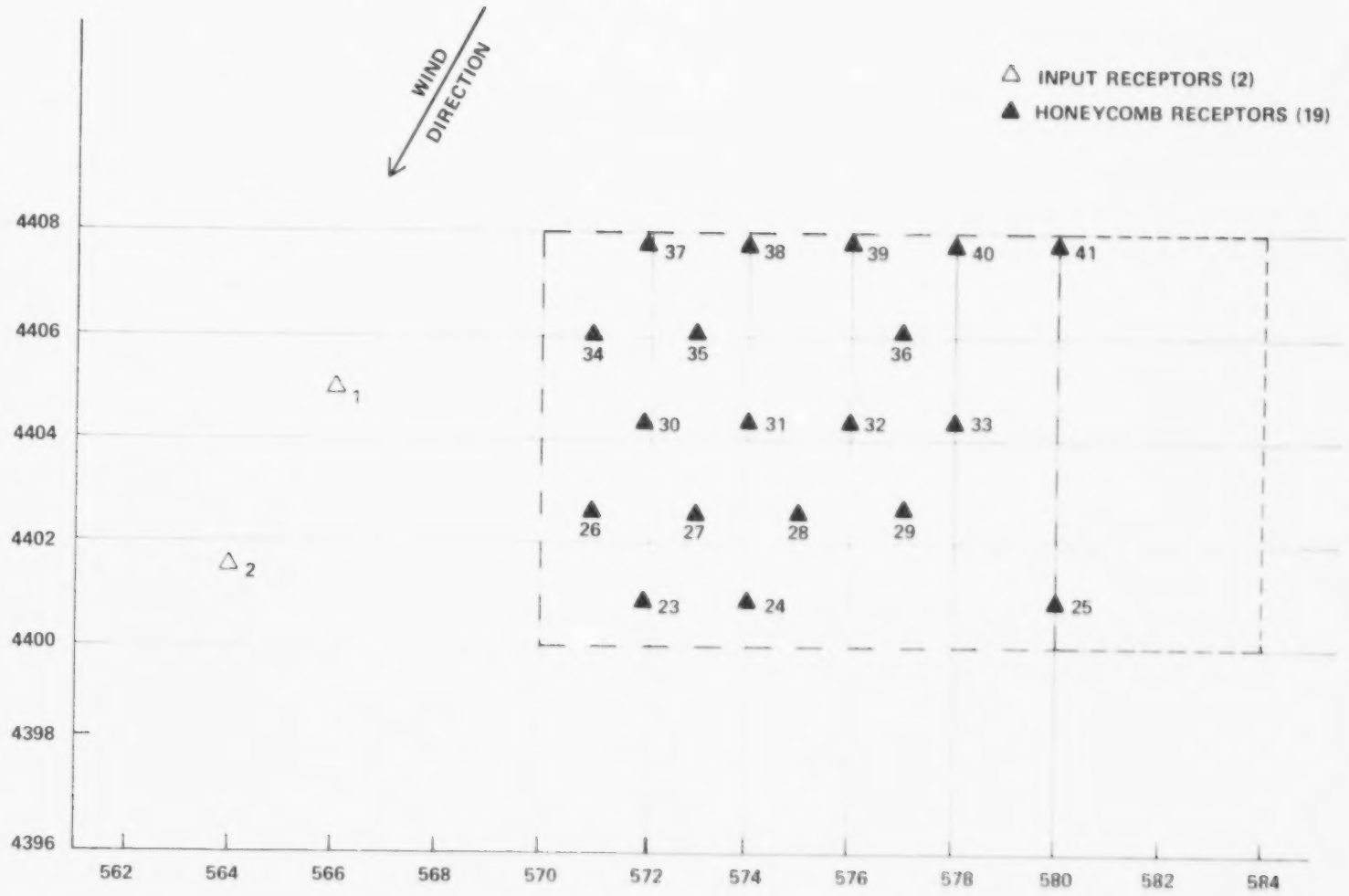

Figure 5. Locations of input receptors and honeycomb receptors for example problem.

```
                                    ************************************
                                    *                                  *
                                    *    EXAMPLE PRINTOUT FROM RAM     *
                                    *                                  *
                                    ************************************

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973

THIS IS THE NORMAL URBAN VERSION(78124) OF RAM FOR APPLICATION TO ONE OR SEVERAL DAYS DATA.

 OPTION       OPTION LIST                    OPTION SPECIFICATION : 0= IGNORE OPTION
                                                                    1= USE OPTION
      1       POINT SOURCE DATA                  1
      2       AREA SOURCE DATA                   1
      3       PERMANENT RECEPTORS                1
      4       SIGNIFICANT POINT RECEPTORS        1
      5       SIGNIFICANT AREA RECEPTORS         1
      6       HONEYCOMB RECEPTORS                1
      7       HOURLY OUTPUT                      1
      8       PARTIAL CONC. WRITTEN TO DISK/TAPE 1
      9       PRINT ONLY SUMMARY HOURLY OUTPUT   0
     10       PUNCH CARDS FOR CONTOURS           1
     11       READ MET DATA FROM CARDS           1
     12       SPECIFY SIGNIFICANT SOURCE NUMBERS 1
     13       READ HOURLY EMISSIONS              1

                  GENERAL INFORMATION FROM RAMQ

UNITS - THERE ARE      2.0000000 USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH (INTERNAL UNIT)
CONONE - THERE ARE      1.6093440 KILOMETERS PER USER UNIT
CONTWO - IT IS CALCULATED THAT THERE ARE      3.2186880 KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH (INTERNAL UNIT)
THIS RUN IS FOR  SO2  SINCE IPOL= 3


                  GENERAL INPUT DATA

NUMBER OF PERIODS TO BE SIMULATED(NPER)=    1
AVERAGING TIME IN HOURS FOR EACH PERIOD(NAVG)=      2
STARTING DATE(IDATE(2),IDATE(1),IHSTRT): JULIAN DAY     1, YEAR 1973 HOUR=  1
RECEPTOR HEIGHT FOR ALL RECEPTORS(Z)    .000 METERS
ASSUMED POLLUTANT HALF-LIFE(HAFL)    14400.00 SECONDS
```

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1972

POINT SOURCE INFORMATION

EMISSION INFORMATION FOR 12 (NPT) POINT SOURCES HAS BEEN DETERMINED BY RAMQ
5 SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN
THE ORDER OF SIGNIFICANCE(IMPS) FOR 25 OR LESS POINT SOURCES DETERMINED BY RAMQ IS LISTED BY POINT SOURCE NUMBER:
5 8 9 11 3

POINT SOURCE LISTING

SOURCE	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)	SO2(G/SEC) EMISSIONS	PART(G/SEC) EMISSIONS	STACK HT(M)	STACK TEMP(K)	STACK DIAM(M)	STACK VEL(M/SEC)
1 PLANT 1	579.50	4406.75	272.36	13.34	82.90	513.10	3.50	13.70
2 PLANT 2	575.25	4405.25	150.47	57.01	76.20	464.30	3.20	12.50
3 PLANT 3	571.25	4407.00	19.01	3.25	25.90	477.60	1.00	15.80
4 PLANT 4	571.75	4402.25	81.06	28.35	40.80	499.80	2.80	17.60
5 PLANT 5	579.50	4403.25	26.14	5.14	18.30	533.20	.60	14.70
6 PLANT 6	567.14	4400.89	2.56	.00	26.50	505.00	1.04	3.81
7 PLANT 7	564.70	4407.50	36.43	.00	48.80	464.00	3.05	18.60
8 PLANT 8	577.45	4401.35	33.64	.00	26.50	428.00	1.68	5.02
9 PLANT 9	576.75	4400.70	38.80	.00	6.00	654.00	.79	24.89
10 PLANT 10	580.10	4412.00	299.50	.00	93.00	405.00	4.88	12.59
11 PLANT 11	583.00	4400.90	16.74	.00	18.10	506.00	1.37	4.23
12 PLANT 12	574.00	4398.00	226.20	.00	93.60	483.00	4.88	12.59

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

AREA SOURCE INFORMATION

EMISSION INFORMATION FOR 15 (NAS) AREA SOURCES HAS BEEN DETERMINED BY RAMQ
10 SIGNIFICANT AREA SOURCES(NSIGA) ARE TO BE USED FOR THIS RUN
THE ORDER OF SIGNIFICANCE(IMAS) FOR 10 OR LESS AREA SOURCES DETERMINED BY RAMQ IS LISTED BY AREA SOURCE NUMBER:
4 3 5 9 2 10 8 7 13 12
NUMBER OF AREA HEIGHT CLASSES(NHTS)= 3
REPRESENTATIVE AREA SOURCE HEIGHTS FOR EACH HEIGHT CLASS(HINT) IN METERS= 11.00 15.00 20.00
BREAK POINT HEIGHT BETWEEN THE AREA HEIGHT CLASSES(BPH) IN METERS= 13.00 17.00
FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGHT(FH)= .750
LIMIT OF DISTANCE FOR AREA SOURCE INTEGRATION TABLES(XLIM) IN USER UNITS = 25.000
BOUNDARIES OF THE AREA SOURCE GRID IN USER UNITS:
RMIN= 570.000 RMAX= 584.000 SMIN= 4400.000 SMAX= 4408.000
SIZE(IRSIZE X ISSIZE) OF AREA SOURCE MAP ARRAY(IA) IN INTERNAL UNITS = 7 EAST-WEST BY 4 NORTH-SOUTH

AREA SOURCE MAP ARRAY(IA)

4	7	7	8	0	9	10	11
3	7	7	6	6	0	12	13
2	1	1	6	6	5	14	15
1	1	1	2	3	4	0	0
	1	2	3	4	5	6	7

AREA SOURCE LISTING

SOURCE	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)	SO2(G/SEC-M**2) EMISSIONS	PART(G/SEC-M**2) EMISSIONS	SIDE LENGTH (USER UNITS)	EFFECTIVE HEIGHT (M)
1	570.0	4400.0	3.0164-08	0.0000	4.0	10.0
2	574.0	4400.0	2.9440-07	0.0000	2.0	10.0
3	576.0	4400.0	6.0328-07	0.0000	2.0	12.0
4	578.0	4400.0	8.5425-07	0.0000	2.0	15.0
5	578.0	4402.0	3.0406-07	0.0000	2.0	10.0
6	574.0	4402.0	0.0000	0.0000	4.0	.0
7	570.0	4404.0	1.0256-07	0.0000	4.0	15.0
8	574.0	4406.0	2.5097-07	0.0000	2.0	10.0
9	578.0	4406.0	2.9923-07	0.0000	2.0	12.0
10	580.0	4406.0	2.6641-07	0.0000	2.0	20.0
11	582.0	4406.0	6.0116-08	0.0000	2.0	20.0
12	580.0	4404.0	1.6023-07	0.0000	2.0	20.0
13	582.0	4404.0	1.8340-07	0.0000	2.0	20.0
14	580.0	4402.0	4.9229-08	0.0000	2.0	20.0
15	582.0	4402.0	1.4286-07	0.0000	2.0	20.0

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

INPUT RECEPTORS

RECEPTOR	IDENTIFICATION	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)
1 I	RECEP 1	566.00	4405.00
2 I	RECEP 2	564.00	4401.50

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

INPUT MET DATA 73/ 1

HOUR	THETA (DEG)	SPEED (M/S)	MIXING HEIGHT(M)	TEMP (DEG-K)	STABILITY CLASS
1	33.00	6.17	429.11	269.82	4
2	23.00	4.63	401.70	271.48	4

RESULTANT MET CONDITIONS

WIND DIRECTION= 28.71
AVERAGE WIND SPEED= 5.40
WIND PERSISTENCE= .996
RESULTANT WIND SPEED= 5.38
AVERAGE TEMP= 270.65
MODAL STABILITY= 4

SIGNIFICANT POINT RECEPTORS

RECEPTOR #	EAST	NORTH	PREDICTED MAX CONC. (MICROGRAMS/M**3)	MAX. DIST (KM)	EFF. HT (M)	U(PHY HT) (M/SEC)
3 P 7	564.43	4407.01	39.39	.902	156.385	8.026
4 P 7	564.16	4406.52		1.804	156.385	8.026
5 P 5	579.45	4403.16	839.47	.166	32.007	6.281
6 P 5	579.40	4403.07		.331	32.007	6.281
7 P 8	577.38	4401.21	448.58	.249	47.506	6.890
8 P 8	577.30	4401.08		.499	47.506	6.890
9 P 9	576.67	4400.55	619.39	.276	52.296	4.753
10 P 9	576.59	4400.40		.551	52.296	4.753
11 P 11	582.94	4400.80	427.63	.187	35.952	6.263
12 P 11	582.89	4400.70		.374	35.952	6.263

SIGNIFICANT AREA SOURCE RECEPTORS

RECEPTOR #	EAST	NORTH
13 A 4	578.42	4399.94
14 A 3	576.43	4399.95
15 A 5	578.43	4401.96
16 A 9	578.43	4405.95
17 A 2	574.43	4399.96
18 A 10	580.41	4405.92
19 A 8	574.43	4405.96
20 A 7	570.87	4403.94
21 A 13	582.41	4403.92
22 A 12	580.41	4403.92

GENERATED HONEYCOMB RECEPTORS

THE AREA TO BE COVERED BY HONEYCOMB RECEPTORS IS BOUNDED BY:
RMIN= 570.000 RMAX= 580.000 SMIN= 4400.000 SMAX= 4408.000

DISTANCE BETWEEN HONEYCOMB RECEPTORS(GRIDSP) IN USER UNITS= 2.000

RECEPTOR	EAST	NORTH
23 H	572.00	4400.87
24 H	574.00	4400.87
25 H	580.00	4400.87
26 H	571.00	4402.60
27 H	573.00	4402.60
28 H	575.00	4402.60
29 H	577.00	4402.60
30 H	572.00	4404.33
31 H	574.00	4404.33
32 H	576.00	4404.33
33 H	578.00	4404.33
34 H	571.00	4406.06
35 H	573.00	4406.06
36 H	577.00	4406.06
37 H	572.00	4407.79
38 H	574.00	4407.79
39 H	576.00	4407.79
40 H	578.00	4407.79
41 H	580.00	4407.79

PLEASE NOTE: THE RECEPTOR NUMBERS AND LOCATIONS GENERATED FOR THIS AVERAGING TIME PERIOD ARE DIFFERENT FROM THOSE GENERATED FOR THE PRECEEDING AVERAGING PERIOD.

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT POINT SOURCES 73/ 1 : HOUR 1

RANK	1	2	3	4	5	TOTAL SIGNIF POINT	TOTAL ALL POINT SOURCES
SOURCE #	7	5	8	9	11		
RECEP #							
1	.000	.000	.000	.000	.000	.000	.000
2	.000	.000	.000	.000	.000	.000	.000
3	35.799	.000	.000	.000	.000	35.799	35.799
4	18.203	.000	.000	.000	.000	18.203	18.203
5	.000	723.757	.000	.000	.000	723.757	723.757
6	.000	368.049	.000	.000	.000	368.049	368.049
7	.000	.357	431.406	.000	.000	431.762	432.202
8	.000	.464	204.270	.000	.000	204.734	205.191
9	.000	.137	7.947	701.982	.000	710.066	712.682
10	.000	.181	9.385	281.595	.000	291.161	293.761
11	.000	.000	.000	.000	433.349	433.349	433.349
12	.000	.000	.000	.000	194.826	194.826	194.826
13	.000	.084	.000	.000	.000	.084	.084
14	.000	.536	13.504	35.822	.000	49.862	51.679
15	.000	7.980	.000	.000	.000	7.980	7.980
16	.000	.000	.000	.000	.000	.000	.754
17	.000	.000	.000	.000	.000	.000	13.839
18	.000	.000	.000	.000	.000	.000	.000
19	.000	.000	.000	.000	.000	.000	.563
20	.000	.000	.000	.000	.000	.000	.000
21	.000	.000	.000	.000	.000	.000	.000
22	.000	.000	.000	.000	.000	.000	.000
23	.000	.000	.000	.000	.000	.000	26.205
24	.000	.000	.000	.000	.000	.000	8.605
25	.000	.000	.000	.000	.000	.000	.000
26	.000	.000	.000	.000	.000	.000	.021
27	.000	.000	.000	.000	.000	.000	19.452
28	.000	.000	.000	.000	.000	.000	9.412
29	.000	.000	.000	.000	.000	.000	29.518
30	.000	.000	.000	.000	.000	.000	.003
31	.000	.000	.000	.000	.000	.000	7.218
32	.000	.000	.000	.000	.000	.000	10.968
33	.000	.000	.000	.000	.000	.000	45.548
34	.000	.000	.000	.000	.000	.000	.820
35	.000	.000	.000	.000	.000	.000	.000
36	.000	.000	.000	.000	.000	.000	12.956
37	.000	.000	.000	.000	.000	.000	.000
38	.000	.000	.000	.000	.000	.000	.000
39	.000	.000	.000	.000	.000	.000	.942
40	.000	.000	.000	.000	.000	.000	15.210
41	.000	.000	.000	.000	.000	.000	.000

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

AREA HTS: 11., 14., 19.; SEPARATION HTS: 12., 16.

CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT AREA SOURCES 73/ 1 : HOUR 1

RANK	1	2	3	4	5	6	7	8	9	10	TOTAL SIGNIF AREA	TOTAL ALL AREA SOURCES
SOURCE #	4	3	5	9	2	10	8	7	13	12		
RECEP #												
1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
3	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
4	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
5	.000	.000	.999	.000	.000	.181	.000	.000	.000	.242	1.421	1.467
6	.000	.000	1.032	.000	.000	.179	.000	.000	.000	.235	1.447	1.493
7	.000	1.847	.485	.000	.000	.323	.000	.000	.000	.074	2.728	2.728
8	.000	1.957	.473	.000	.000	.322	.000	.000	.000	.076	2.828	2.828
9	.000	2.288	.321	.000	.000	.320	.000	.000	.000	.031	2.960	2.960
10	.000	2.365	.325	.000	.000	.319	.000	.000	.000	.033	3.043	3.043
11	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.048
12	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.045
13	2.962	.000	.088	.000	.000	.000	.000	.000	.061	.143	3.254	3.400
14	.000	2.352	.367	.000	.000	.317	.000	.000	.000	.053	3.089	3.089
15	.097	.000	1.276	.000	.000	.238	.000	.000	.000	.164	1.775	1.801
16	.000	.000	.000	1.166	.000	.000	.000	.000	.000	.000	1.166	1.166
17	.000	.000	.000	.399	1.235	.000	.000	.000	.000	.000	1.634	1.634
18	.000	.000	.000	.000	.000	.798	.000	.000	.000	.049	.846	.846
19	.000	.000	.000	.000	.000	.000	1.053	.000	.000	.000	1.053	1.053
20	.000	.000	.000	.000	.000	.000	.000	.495	.000	.000	.495	.512
21	.000	.000	.000	.000	.000	.000	.000	.000	.549	.000	.549	.612
22	.000	.000	.000	.000	.000	.065	.000	.000	.000	.480	.544	.641
23	.000	.000	.000	.000	.000	.000	.183	.000	.000	.000	.183	.342
24	.000	.000	.000	.195	1.075	.000	.000	.000	.000	.000	1.270	1.270
25	.000	.000	.000	.000	.000	.000	.000	.000	.227	.000	.227	.349
26	.000	.000	.000	.000	.000	.000	.141	.229	.000	.000	.371	.489
27	.000	.000	.000	.000	.000	.000	.224	.012	.000	.000	.235	.354
28	.000	.000	.000	.161	.000	.000	.000	.000	.000	.000	.161	.161
29	.000	.000	.000	.255	.000	.128	.000	.000	.000	.000	.382	.382
30	.000	.000	.000	.000	.000	.000	.110	.460	.000	.000	.570	.570
31	.000	.000	.000	.000	.000	.000	.275	.000	.000	.000	.275	.275
32	.000	.000	.000	.125	.000	.000	.000	.000	.000	.000	.125	.125
33	.000	.000	.000	.314	.000	.099	.000	.000	.000	.000	.412	.412
34	.000	.000	.000	.000	.000	.000	.000	.379	.000	.000	.379	.379
35	.000	.000	.000	.000	.000	.000	.084	.348	.000	.000	.432	.432
36	.000	.000	.000	.096	.000	.000	.000	.000	.000	.000	.096	.096
37	.000	.000	.000	.000	.000	.000	.000	.134	.000	.000	.134	.134
38	.000	.000	.000	.000	.000	.000	.436	.000	.000	.000	.436	.436
39	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
40	.000	.000	.000	.497	.000	.000	.000	.000	.000	.000	.497	.497
41	.000	.000	.000	.000	.000	.264	.000	.000	.000	.000	.264	.264

RUN BY: ED KRENSMAN, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

SUMMARY CONCENTRATION TABLE(MICROGRAMS/M**3) 73/ 1 : HOUR 1

HOUR	THETA (DEG)	SPEED (M/S)	MIXING HEIGHT(M)	TEMP (K)	STABILITY CLASS
1	33.00	6.17	429.11	289.82	4

AREA HTS: 11., 14., 19.; SEPARATION HTS: 12., 16.

RECEPTOR NO.		EAST	NORTH	TOTAL FROM SIGNIF POINT SOURCES	TOTAL FROM ALL POINT SOURCES	TOTAL FROM SIGNIF AREA SOURCES	TOTAL FROM ALL AREA SOURCES	TOTAL FROM ALL SOURCES	CONCENTRATION RANK
1	I 0	566.00	4405.00	.0000	.0000	.0000	.0000	.0000	41
2	I 0	564.00	4401.50	.0000	.0000	.0000	.0000	.0000	40
3	F 7	564.43	4407.01	35.7987	35.7987	.0000	.0000	35.7987	11
4	F 7	564.16	4406.52	18.2026	18.2026	.0000	.0000	18.2026	15
5	F 5	579.45	4403.16	723.7571	723.7571	1.4215	1.4667	725.2238	1
6	F 5	579.40	4403.07	368.0487	368.0487	1.4465	1.4929	369.5415	5
7	F 8	577.38	4401.21	431.7621	432.2024	2.7281	2.7281	434.9305	3
8	F 8	577.30	4401.08	204.7343	205.1913	2.8280	2.8280	208.0193	7
9	F 9	576.67	4400.55	710.0658	712.6823	2.9602	2.9602	715.6425	2
10	F 9	576.59	4400.40	291.1613	293.7612	3.0427	3.0427	296.8038	6
11	F 11	582.94	4400.80	433.3493	433.3493	.0000	.0483	433.3975	4
12	F 11	582.89	4400.70	194.8263	194.8263	.0000	.0445	194.8708	8
13	A 4	578.42	4399.94	.0837	.0837	3.2543	3.4000	3.4837	24
14	A 7	576.43	4399.95	49.8623	51.6786	3.0888	3.0888	54.7674	9
15	A 5	578.43	4401.96	7.9795	7.9803	1.7745	1.8009	9.7811	21
16	A 9	578.43	4405.95	.0000	.7536	1.1665	1.1665	1.9200	25
17	A 2	574.43	4399.46	.0000	13.9389	1.6338	1.6338	15.4727	17
18	A 10	580.41	4405.92	.0000	.0000	.8464	.8464	.8464	29
19	A 8	574.43	4405.46	.0000	.5625	1.0529	1.0529	1.6154	26
20	A 7	570.87	4403.94	.0000	.0000	.4950	.5121	.5121	33
21	A 13	582.41	4403.92	.0000	.0000	.5493	.6120	.6120	31
22	A 12	580.41	4403.92	.0000	.0000	.5444	.6414	.6414	30
23	H 0	572.00	4400.87	.0000	26.2047	.1834	.3421	26.5468	13
24	H 0	574.00	4400.87	.0000	8.6048	1.2702	1.2702	9.8749	20
25	H 0	580.00	4400.87	.0000	.0000	.2272	.3489	.3489	37
26	H 0	571.00	4402.60	.0000	.0214	.3706	.4890	.5104	34
27	H 0	573.00	4402.60	.0000	19.4521	.2353	.3536	19.8057	14
28	H 0	575.00	4402.60	.0000	9.4123	.1610	.1610	9.5734	22
29	H 0	577.00	4402.60	.0000	29.5180	.3822	.3822	29.9002	12
30	H 0	572.00	4404.33	.0000	.0028	.5696	.5696	.5724	32
31	H 0	574.00	4404.33	.0000	7.2180	.2753	.2753	7.4933	23
32	H 0	576.00	4404.33	.0000	10.9682	.1248	.1248	11.0931	19
33	H 0	578.00	4404.33	.0000	45.5482	.4121	.4121	45.9603	10
34	H 0	571.00	4406.06	.0000	.8200	.3788	.3788	1.1988	27
35	H 0	573.00	4406.06	.0000	.0001	.4319	.4319	.4320	36
36	H 0	577.00	4406.06	.0000	12.9563	.0959	.0959	13.0522	18
37	H 0	572.00	4407.79	.0000	.0000	.1342	.1342	.1342	39
38	H 0	574.00	4407.79	.0000	.0000	.4364	.4364	.4364	35
39	H 0	576.00	4407.79	.0000	.9420	.0000	.0000	.9420	28
40	H 0	578.00	4407.79	.0000	15.2102	.4971	.4971	15.7073	16
41	H 0	580.00	4407.79	.0000	.0000	.2645	.2645	.2645	38

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT POINT SOURCES 73/ 1 : HOUR 2

RANK	1	2	3	4	5	TOTAL SIGNIF POINT	TOTAL ALL POINT SOURCES
SOURCE #	7	5	8	6	11		
RECEP #							
1	.000	.000	.000	.000	.000	.000	.000
2	.003	.000	.000	.000	.000	.003	.003
3	29.231	.000	.000	.000	.000	29.231	29.231
4	18.745	.000	.000	.000	.000	18.745	18.745
5	.000	684.939	.000	.000	.000	684.939	684.941
6	.000	417.785	.000	.000	.000	417.785	417.788
7	.000	.001	399.482	.000	.000	399.483	435.730
8	.000	.001	228.979	.000	.000	228.980	265.410
9	.000	.000	.297	571.809	.000	572.106	609.730
10	.000	.000	.484	294.201	.000	294.685	331.675
11	.000	.000	.000	.000	394.135	394.135	394.135
12	.000	.000	.000	.000	217.816	217.816	217.816
13	.000	5.793	.000	.000	.000	5.793	5.853
14	.000	.001	2.253	104.778	.000	107.032	143.421
15	.000	.555	.000	.000	.000	.555	3.605
16	.000	.000	.000	.000	.000	.000	5.777
17	.000	.000	.000	.000	.000	.000	22.261
18	.000	.000	.000	.000	.000	.000	.000
19	.000	.000	.000	.000	.000	.000	.000
20	.000	.000	.000	.000	.000	.000	.067
21	.000	.000	.000	.000	.000	.000	.000
22	.000	.000	.000	.000	.000	.000	.000
23	.000	.000	.000	.000	.000	.000	.190
24	.000	.000	.000	.000	.000	.000	14.746
25	.000	.000	.000	.000	.000	.000	.000
26	.000	.000	.000	.000	.000	.000	.001
27	.000	.000	.000	.000	.000	.000	.102
28	.000	.000	.000	.000	.000	.000	8.552
29	.000	.000	.000	.000	.000	.000	22.515
30	.000	.000	.000	.000	.000	.000	.000
31	.000	.000	.000	.000	.000	.000	.001
32	.000	.000	.000	.000	.000	.000	13.845
33	.000	.000	.000	.000	.000	.000	22.552
34	.000	.000	.000	.000	.000	.000	14.716
35	.000	.000	.000	.000	.000	.000	.000
36	.000	.000	.000	.000	.000	.000	23.870
37	.000	.000	.000	.000	.000	.000	.000
38	.000	.000	.000	.000	.000	.000	.000	.000
39	.000	.000	.000	.000	.000	.000	.000	.000
40	.000	.000	.000	.000	.000	.000	.000	43.276
41	.000	.000	.000	.000	.000	.000	.000	.001

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

AREA HTS: 11., 15., 20.; SEPARATION HTS: 13., 17.

CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT AREA SOURCES 73/ 1 : HOUR 2

RANK	1	2	3	4	5	6	7	8	9	10	TOTAL SIGNIF AREA	TOTAL ALL AREA SOURCES
SOURCE #	4	3	5	9	2	10	8	7	13	12		
RECEP #												
1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
3	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
4	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
5	.000	.000	1.255	.000	.000	.425	.000	.000	.000	.220	1.901	1.901
6	.000	.000	1.304	.000	.000	.425	.000	.000	.000	.212	1.941	1.941
7	.000	2.319	.417	.383	.000	.123	.000	.000	.000	.000	3.217	3.217
8	.000	2.463	.391	.373	.000	.114	.000	.000	.000	.000	3.341	3.341
9	.000	2.894	.090	.511	.000	.000	.000	.000	.000	.000	3.495	3.495
10	.000	2.995	.077	.509	.000	.000	.000	.000	.000	.000	3.581	3.581
11	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.170
12	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.160
13	3.831	.000	.489	.000	.000	.403	.000	.000	.000	.251	4.973	4.987
14	.000	3.050	.097	.505	.000	.000	.000	.000	.000	.000	3.652	3.652
15	.073	.000	1.648	.000	.000	.417	.000	.000	.000	.044	2.182	2.182
16	.000	.000	.000	1.513	.000	.000	.000	.000	.000	.000	1.513	1.513
17	.000	.000	.000	.000	1.596	.000	.000	.000	.000	.000	1.596	1.596
18	.000	.000	.000	.000	.000	1.030	.000	.000	.000	.047	1.077	1.077
19	.000	.000	.000	.000	.000	.000	1.361	.000	.000	.000	1.361	1.361
20	.000	.000	.000	.000	.000	.000	.000	.439	.000	.000	.439	.657
21	.000	.000	.000	.000	.000	.000	.000	.000	.709	.000	.709	.860
22	.000	.000	.000	.000	.000	.364	.000	.000	.000	.620	.984	1.019
23	.000	.000	.000	.000	.000	.000	.451	.138	.000	.000	.589	.792
24	.000	.000	.000	.000	1.356	.000	.000	.000	.000	.000	1.356	1.356
25	.000	.000	.000	.000	.000	.000	.000	.000	.061	.201	.262	.474
26	.000	.000	.000	.000	.000	.000	.000	.362	.000	.000	.362	.512
27	.000	.000	.000	.000	.000	.000	.466	.095	.000	.000	.561	.711
28	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
29	.000	.000	.000	.531	.000	.000	.000	.000	.000	.000	.531	.531
30	.000	.000	.000	.000	.000	.000	.000	.636	.000	.000	.636	.636
31	.000	.000	.000	.000	.000	.000	.494	.000	.000	.000	.494	.494
32	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
33	.000	.000	.000	.563	.000	.000	.000	.000	.000	.000	.563	.563
34	.000	.000	.000	.000	.000	.000	.000	.479	.000	.000	.479	.479
35	.000	.000	.000	.000	.000	.000	.000	.479	.000	.000	.479	.479
36	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
37	.000	.000	.000	.000	.000	.000	.000	.159	.000	.000	.159	.159
38	.000	.000	.000	.000	.000	.000	.526	.000	.000	.000	.526	.526
39	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
40	.000	.000	.000	.599	.000	.000	.000	.000	.000	.000	.599	.599
41	.000	.000	.000	.000	.000	.307	.000	.000	.000	.000	.307	.307

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

SUMMARY CONCENTRATION TABLE(MICROGRAMS/M**3) 73/ 1 : HOUR 2

HOUR	THETA (DEG)	SPEED (M/S)	MIXING HEIGHT(M)	TEMP (K)	STABILITY CLASS
2	23.00	4.67	401.70	271.48	4

AREA HTS: 11., 15., 20.; SEPARATION HTS: 13., 17.

RECEPTOR NO.		EAST	NORTH	TOTAL FROM SIGNIF POINT SOURCES	TOTAL FROM ALL POINT SOURCES	TOTAL FROM SIGNIF AREA SOURCES	TOTAL FROM ALL AREA SOURCES	TOTAL FROM ALL SOURCES	CONCENTRATION RANK
1	I 0	566.00	4405.00	.0000	.0000	.0000	.0000	.0000	41
2	I 0	564.00	4401.50	.0025	.0025	.0000	.0000	.0025	39
3	F 7	564.43	4407.01	29.2308	29.2308	.0000	.0000	29.2308	11
4	F 7	564.16	4406.52	18.7447	18.7447	.0000	.0000	18.7447	16
5	F 5	579.45	4403.16	684.9385	684.9407	1.9007	1.9007	686.8414	1
6	F 5	579.40	4403.07	417.7846	417.7882	1.9407	1.9407	419.7289	4
7	F 8	577.36	4401.21	399.4826	435.7304	3.2174	3.2174	438.9479	3
8	F 8	577.30	4401.09	226.9502	265.4095	3.3406	3.3406	268.7501	7
9	F 9	576.67	4400.55	572.1059	609.7302	3.4947	3.4947	613.2249	2
10	F 9	576.59	4400.40	294.6850	331.6750	3.5814	3.5814	335.2564	6
11	F 11	582.94	4400.80	394.1352	394.1352	.0000	.1700	394.3052	5
12	F 11	582.89	4400.70	217.8158	217.8158	.0000	.1692	217.9850	8
13	A 4	576.42	4399.94	5.7934	5.8530	4.9734	4.9866	10.8396	20
14	A 3	576.43	4399.95	107.0322	143.4206	3.6524	3.6524	147.0729	9
15	A 5	578.43	4401.96	.5552	3.6050	2.1820	2.1820	5.7870	23
16	A 9	578.43	4405.95	.0000	8.7774	1.5130	1.5130	10.2905	21
17	A 2	574.43	4399.96	.0000	22.2611	1.5960	1.5960	23.8571	13
18	A 10	580.41	4405.92	.0000	.0000	1.0770	1.0770	1.0770	25
19	A 8	574.43	4405.96	.0000	.0000	1.3605	1.3605	1.3605	24
20	A 7	570.87	4403.94	.0000	.0670	.6390	.6566	.7236	30
21	A 13	582.41	4403.92	.0000	.0000	.7092	.8604	.8604	28
22	A 12	580.41	4403.92	.0000	.0000	.9836	1.0191	1.0191	26
23	H 0	572.00	4400.67	.0000	.1903	.5889	.7921	.9825	27
24	H 0	574.00	4400.67	.0000	14.7456	1.3561	1.3561	16.1017	17
25	H 0	580.00	4400.67	.0000	.0000	.2621	.4738	.4738	36
26	H 0	571.00	4402.60	.0000	.0005	.3618	.5115	.5120	33
27	H 0	573.00	4402.60	.0000	.1024	.5611	.7108	.8131	29
28	H 0	575.00	4402.60	.0000	8.5524	.0000	.0000	8.5524	22
29	H 0	577.00	4402.60	.0000	22.5152	.5312	.5312	23.0464	15
30	H 0	572.00	4404.33	.0000	.0000	.6356	.6356	.6356	31
31	H 0	574.00	4404.33	.0000	.0011	.4943	.4943	.4955	34
32	H 0	576.00	4404.33	.0000	13.8445	.0000	.0000	13.8445	19
33	H 0	578.00	4404.33	.0000	22.5524	.5631	.5631	23.1156	14
34	H 0	571.00	4406.06	.0000	14.7163	.4789	.4789	15.1952	18
35	H 0	573.00	4406.06	.0000	.0000	.4789	.4789	.4789	35
36	H 0	577.00	4406.06	.0000	23.8704	.0000	.0000	23.8704	12
37	H 0	572.00	4407.79	.0000	.0000	.1591	.1591	.1591	38
38	H 0	574.00	4407.79	.0000	.0000	.5260	.5260	.5260	32
39	H 0	576.00	4407.79	.0000	.0001	.0000	.0000	.0001	40
40	H 0	578.00	4407.79	.0000	43.2758	.5992	.5992	43.8750	10
41	H 0	580.00	4407.79	.0000	.0013	.3073	.3073	.3086	37

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

2-HOUR AVERAGE SO2 CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT POINT SOURCES 73/ 1 START HOUR: 1

RANK	1	2	3	4	5	TOTAL SIGNIF POINT	TOTAL ALL POINT SOURCES
SOURCE #	7	5	8	6	11		
RECEP #							
1	.000	.000	.000	.000	.000	.000	.000
2	.001	.000	.000	.000	.000	.001	.001
3	32.515	.000	.000	.000	.000	32.515	32.515
4	18.474	.000	.000	.000	.000	18.474	18.474
5	.000	704.348	.000	.000	.000	704.348	704.349
6	.000	392.917	.000	.000	.000	392.917	392.918
7	.000	.179	415.444	.000	.000	415.622	433.966
8	.000	.233	216.625	.000	.000	216.857	235.300
9	.000	.069	4.122	636.895	.000	641.086	661.206
10	.000	.091	4.934	287.898	.000	292.923	312.718
11	.000	.000	.000	.000	413.742	413.742	413.742
12	.000	.000	.000	.000	206.321	206.321	206.321
13	.000	2.939	.000	.000	.000	2.939	2.968
14	.000	.268	7.879	70.300	.000	78.447	97.550
15	.000	4.267	.000	.000	.000	4.267	5.793
16	.000	.000	.000	.000	.000	.000	4.765
17	.000	.000	.000	.000	.000	.000	18.050
18	.000	.000	.000	.000	.000	.000	.000
19	.000	.000	.000	.000	.000	.000	.281
20	.000	.000	.000	.000	.000	.000	.034
21	.000	.000	.000	.000	.000	.000	.000
22	.000	.000	.000	.000	.000	.000	.000
23	.000	.000	.000	.000	.000	.000	13.198
24	.000	.000	.000	.000	.000	.000	11.675
25	.000	.000	.000	.000	.000	.000	.000
26	.000	.000	.000	.000	.000	.000	.011
27	.000	.000	.000	.000	.000	.000	9.777
28	.000	.000	.000	.000	.000	.000	6.982
29	.000	.000	.000	.000	.000	.000	26.017
30	.000	.000	.000	.000	.000	.000	.001
31	.000	.000	.000	.000	.000	.000	3.610
32	.000	.000	.000	.000	.000	.000	12.406
33	.000	.000	.000	.000	.000	.000	34.050
34	.000	.000	.000	.000	.000	.000	7.768
35	.000	.000	.000	.000	.000	.000	.000
36	.000	.000	.000	.000	.000	.000	18.413
37	.000	.000	.000	.000	.000	.000	.000
38	.000	.000	.000	.000	.000	.000	.000
39	.000	.000	.000	.000	.000	.000	.471
40	.000	.000	.000	.000	.000	.000	29.243
41	.000	.000	.000	.000	.000	.000	.001

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION IV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

2-HOUR AVERAGE SO2 CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT AREA SOURCES 73/ 1 START HOUR: 1

RANK	1	2	3	4	5	6	7	8	9	10	TOTAL SIGNIF AREA	TOTAL ALL AREA SOURCES
SOURCE #	4	3	5	6	2	10	8	7	13	12		
RECEP #												
1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
3	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
4	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
5	.000	.000	1.127	.000	.000	.303	.000	.000	.000	.231	1.661	1.684
6	.000	.000	1.165	.000	.000	.302	.000	.000	.000	.224	1.694	1.717
7	.000	2.083	.448	.182	.000	.223	.000	.000	.000	.037	2.973	2.973
8	.000	2.210	.432	.186	.000	.218	.000	.000	.000	.038	3.084	3.084
9	.000	2.591	.204	.255	.000	.160	.000	.000	.000	.016	3.227	3.227
10	.000	2.680	.201	.255	.000	.160	.000	.000	.000	.017	3.312	3.312
11	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.109
12	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.107
13	3.397	.000	.284	.000	.000	.202	.000	.000	.030	.197	4.114	4.193
14	.000	2.701	.232	.252	.000	.159	.000	.000	.000	.026	3.371	3.371
15	.685	.000	1.462	.000	.000	.328	.000	.000	.000	.104	1.978	1.991
16	.000	.000	.000	1.340	.000	.000	.000	.000	.000	.000	1.340	1.340
17	.000	.000	.000	.199	1.416	.000	.000	.000	.000	.000	1.615	1.615
18	.000	.000	.000	.000	.000	.914	.000	.000	.000	.048	.962	.962
19	.000	.000	.000	.000	.000	.000	1.207	.000	.000	.000	1.207	1.207
20	.000	.000	.000	.000	.000	.000	.000	.567	.000	.000	.567	.584
21	.000	.000	.000	.000	.000	.000	.000	.000	.629	.000	.629	.736
22	.000	.000	.000	.000	.000	.214	.000	.000	.000	.550	.764	.830
23	.000	.000	.000	.000	.000	.000	.317	.069	.000	.000	.386	.567
24	.000	.000	.000	.098	1.215	.000	.000	.000	.000	.000	1.313	1.313
25	.000	.000	.000	.000	.000	.000	.000	.000	.144	.101	.245	.411
26	.000	.000	.000	.000	.000	.000	.071	.296	.000	.000	.366	.500
27	.000	.000	.000	.000	.000	.000	.345	.053	.000	.000	.398	.532
28	.000	.000	.000	.081	.000	.000	.000	.000	.000	.000	.081	.081
29	.000	.000	.000	.393	.000	.064	.000	.000	.000	.000	.457	.457
30	.000	.000	.000	.000	.000	.000	.055	.548	.000	.000	.603	.603
31	.000	.000	.000	.000	.000	.000	.385	.000	.000	.000	.385	.385
32	.000	.000	.000	.062	.000	.000	.000	.000	.000	.000	.062	.062
33	.000	.000	.000	.438	.000	.049	.000	.000	.000	.000	.488	.488
34	.000	.000	.000	.000	.000	.000	.000	.429	.000	.000	.429	.429
35	.000	.000	.000	.000	.000	.000	.042	.413	.000	.000	.455	.455
36	.000	.000	.000	.048	.000	.000	.000	.000	.000	.000	.048	.048
37	.000	.000	.000	.000	.000	.000	.000	.147	.000	.000	.147	.147
38	.000	.000	.000	.000	.000	.000	.481	.000	.000	.000	.481	.481
39	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
40	.000	.000	.000	.548	.000	.000	.000	.000	.000	.000	.548	.548
41	.000	.000	.000	.000	.000	.286	.000	.000	.000	.000	.286	.286

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

2-HOUR AVERAGE SO2 SUMMARY CONCENTRATION TABLE(MICROGRAMS/M**3) 73/ 1 START HOUR: 1

RECEPTOR NO.	EAST	NORTH	TOTAL FROM SIGNIF POINT SOURCES	TOTAL FROM ALL POINT SOURCES	TOTAL FROM SIGNIF AREA SOURCES	TOTAL FROM ALL AREA SOURCES	TOTAL FROM ALL SOURCES	CONCENTRATION RANK
1 I 0	566.00	4405.00	.0000	.0000	.0000	.0000	.0000	41
2 I 0	564.00	4401.50	.0013	.0013	.0000	.0000	.0013	40
3 P 7	564.43	4407.01	32.5148	32.5148	.0000	.0000	32.5148	11
4 P 7	564.16	4406.52	18.4737	18.4737	.0000	.0000	18.4737	15
5 P 5	579.45	4403.16	704.3478	704.3489	1.6611	1.6837	706.0326	1
6 P 5	579.40	4403.07	392.9166	392.9184	1.6936	1.7168	394.6352	5
7 P 8	577.38	4401.21	415.6223	433.9664	2.9728	2.9728	436.9392	3
8 P 8	577.30	4401.06	216.8572	235.3004	3.0843	3.0843	238.3847	7
9 P 9	576.67	4400.55	641.0958	661.2062	3.2274	3.2274	664.4337	2
10 P 9	576.59	4400.40	292.9232	312.7181	3.3120	3.3120	316.0301	6
11 P 11	582.94	4400.80	413.7422	413.7422	.0000	.1091	413.8514	4
12 P 11	582.89	4400.70	206.3210	206.3210	.0000	.1069	206.4279	8
13 A 4	578.42	4399.94	2.9385	2.9683	4.1139	4.1933	7.1616	24
14 A 3	576.43	4399.95	78.4472	97.5496	3.3706	3.3706	100.9202	9
15 A 5	578.43	4401.96	4.2674	5.7926	1.9783	1.9914	7.7841	23
16 A 9	578.43	4405.95	.0000	4.7655	1.3397	1.3397	6.1052	25
17 A 2	574.43	4399.96	.0000	18.0500	1.6149	1.6149	19.6649	14
18 A 10	580.41	4405.92	.0000	.0000	.9617	.9617	.9617	26
19 A 8	574.43	4405.96	.0000	.2813	1.2067	1.2067	1.4880	27
20 A 7	570.87	4403.94	.0000	.0335	.5670	.5843	.6179	31
21 A 13	582.41	4403.92	.0000	.0000	.6292	.7362	.7362	30
22 A 12	580.41	4403.92	.0000	.0000	.7640	.8303	.8303	29
23 H 0	572.00	4400.87	.0000	13.1975	.3962	.5671	13.7646	17
24 H 0	574.00	4400.87	.0000	11.6752	1.3131	1.3131	12.9883	18
25 H 0	580.00	4400.87	.0000	.0000	.2447	.4113	.4113	37
26 H 0	571.00	4402.60	.0000	.0110	.3562	.5002	.5112	33
27 H 0	573.00	4402.60	.0000	9.7772	.3982	.5322	10.3094	20
28 H 0	575.00	4402.60	.0000	8.9824	.0805	.0805	9.0629	21
29 H 0	577.00	4402.60	.0000	25.0166	.4567	.4567	26.4733	13
30 H 0	572.00	4404.33	.0000	.0014	.6026	.6026	.6040	32
31 H 0	574.00	4404.33	.0000	3.6096	.3848	.3848	3.9944	26
32 H 0	576.00	4404.33	.0000	12.4064	.0624	.0624	12.4688	19
33 H 0	578.00	4404.33	.0000	34.0503	.4876	.4876	34.5379	10
34 H 0	571.00	4406.06	.0000	7.7681	.4289	.4289	8.1970	22
35 H 0	573.00	4406.06	.0000	.0001	.4554	.4554	.4555	36
36 H 0	577.00	4406.06	.0000	18.4134	.0479	.0479	18.4613	16
37 H 0	572.00	4407.79	.0000	.0000	.1466	.1466	.1466	39
38 H 0	574.00	4407.79	.0000	.0000	.4912	.4912	.4912	34
39 H 0	576.00	4407.79	.0000	.4711	.0000	.0000	.4711	35
40 H 0	578.00	4407.79	.0000	29.2430	.5462	.5462	29.7912	12
41 H 0	580.00	4407.79	.0000	.0007	.2959	.2959	.2965	38

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C***    URBAN  BATCH VERSION(78124) OF RAM                                    RAM0010
C***RAM IS AN EFFICIENT GAUSSIAN-PLUME MULTIPLE-SOURCE                       RAM0020
C***AIR QUALITY ALGORITHM. RAM IS DESCRIBED IN: NOVAK,J.H., AND              RAM0030
C***TURNER,D.B., 1976: AIR POLLUTION CONTROL ASSOC. J., VOL. 26, NO. 6,      RAM0040
C***PAGES 570-575(JUNE 1976). RAM'S PRINCIPAL USE IS TO DETERMINE            RAM0050
C***SHORT TERM(ONE-HOUR TO ONE-DAY) CONCENTRATIONS FROM POINT AND            RAM0060
C***AREA SOURCES IN URBAN AREAS.                                             RAM0070
C***SEE RAM GLOSSARY FOR DEFINITIONS OF VARIABLES.                           RAM0080
C***                                                                         RAM0090
C***          POINT SOURCE INFORMATION                                       RAM0100
C***                                                                         RAM0110
C***SOURCE(9,#PT SOURCES)      1=EAST CO-ORD(USER UNITS)                     RAM0120
C***                           2=NORTH CO-ORD(USER UNITS)                    RAM0130
C***                           3=SO2 EMISSION RATE(G/SEC)                    RAM0140
C***                           4=PART EMISSION RATE(G/SEC)                   RAM0150
C***                           5=STACK HEIGHT(M)                             RAM0160
C***                           6=STACK TEMP(K)                               RAM0170
C***                           7=STACK DIAM(M)                               RAM0180
C***                           8=STACK VELOCITY(M/S)                         RAM0190
C***                           9=PARTIAL CALCULATION OF BUOYANCY             RAM0200
C***PNAME           12 CHARACTER PLANT IDENTIFICATION                        RAM0210
C***          AREA SOURCE INFORMATION                                        RAM0220
C***ASORC(6,#AREA SOURCES)  1=X CO-ORD(USER UNITS), SOUTHWEST CORNER         RAM0230
C***                        2=Y CO-ORD(USER UNITS), SOUTHWEST CORNER         RAM0240
C***                        3=SO2 EMISSION RATE(G/SEC)                       RAM0250
C***                        4=PART EMISSION RATE(G/SEC)                      RAM0260
C***                        5=SIDE LENGTH(USER UNITS)                        RAM0270
C***                        6=STACK HEIGHT(M)                                RAM0280
      COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),AXCO     RAM0290
     1F(6,9),AXEXP(6,9),HC1(10)                                              RAM0300
      COMMON /RELC/ CIN(3,200)                                               RAM0310
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR     RAM0320
     1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S     RAM0330
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)      RAM0340
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA     RAM0350
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),TWO,PAR     RAM0360
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)      RAM0370
      COMMON /HEIGHT/ HINT(3),HARE(3),BPHM(2),FH                             RAM0380
      COMMON /METDAT/ QTHETA(24),QU(24),IKSI(24),QHL(24),QTEMP(24),IDATE     RAM0390
     1(2)                                                                    RAM0400
      COMMON /HCGRID/ HRMIN,HRMAX,HSMIN,HSMAX                                RAM0410
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                        RAM0420
      DIMENSION IFREQ(7), DEG(3), HSAV(250), RNAME(2,50), DUMR(24), HLH(     RAM0430
     12,24), LINE1(14), LINE2(14), LINE3(14), MODEL(2), DSAV(250), IMPS(     RAM0440
     225), IMAS(10), UPREC(150), USREC(150), TITLE(2)                        RAM0450
      DATA IFREQ /7*0/ ,DEG /90.,180.,270./ ,ICHAR /'I'/                     RAM0460
      DATA PL /0.15,0.15,0.20,0.25,0.40,0.60/                                RAM0470
      DATA MODEL /'RURAL ','URBAN '/ ,TITLE /' SO2  ',' PART '/              RAM0480
      NRECEP=0                                                               RAM0490
      NPREC=0                                                                RAM0500
      NP=0                                                                   RAM0510
      IN=5                                                                   RAM0520
      IO=6                                                                   RAM0530
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C***NID-DISK OR TAPE INPUT OF PREPROCESSED EMISSION DATA. LIMITED TO:     RAM0540
C***150 RECEPTORS,250 POINT SOURCES AND 100 AREA SOURCES                  RAM0550
C***NIP-DISK OUTPUT OF PARTIAL CONCENTRATIONS AT EACH RECEPTOR            RAM0560
C***NIT-DISK INPUT OF MET DATA                                            RAM0570
C***UNIT 15 - TAPE/DISK INPUT OF HOURLY POINT SOURCE EMISSIONS            RAM0580
C***UNIT 16 - TAPE/DISK INPUT OF HOURLY AREA SOURCE EMISSIONS             RAM0590
      NID=9                                                               RAM0600
      NIP=10                                                              RAM0610
      NIT=11                                                              RAM0620
C***THREE SYSTEMS OF LENGTH AND COORDINATES ARE USED IN RAM:              RAM0630
C***  THE FIRST SYSTEM, USER UNITS, IS SELECTED BY THE USER AND           RAM0640
C***   NORMALLY USE THE COORDINATE SYSTEM OF THE EMISSION INVENTORY.      RAM0650
C***   ALL LOCATIONS INPUT BY THE USER(SUCH AS SOURCES AND RECEPTORS)     RAM0660
C***   ARE IN THIS SYSTEM. ALSO AS A CONVENIENCE TO THE USER ALL          RAM0670
C***   LOCATIONS ON OUTPUT ARE ALSO IN THIS SYSTEM.                       RAM0680
C***  THE SECOND SYSTEM, INTERNAL UNITS, IS USED INTERNALLY IN RAM        RAM0690
C***   FOR COORDINATE LOCATIONS AND DISTANCES. ONE INTERNAL UNIT IS THE   RAM0700
C***   SIDE LENGTH OF THE SMALLEST AREA SOURCE SQUARE. THIS LENGTH MUST   RAM0710
C***   BE IDENTIFIED AND SPECIFIED BY THE USER. THE PURPOSE OF USING      RAM0720
C***   INTERNAL UNITS IS TO HAVE A CORRESPONDENCE BETWEEN LOCATION(GRID   RAM0730
C***   COORDINATES) AND PARTICULAR AREA SOURCE POSITIONS. THIS IS         RAM0740
C***   ACCOMPLISHED THROUGH THE USE OF THE AREA SOURCE MAP ARRAY(IA ARRAY RAM0750
C***   ). THIS ALLOWS DETERMINATION AS TO WITHIN WHICH AREA SOURCE ANY    RAM0760
C***   COORDINATE POINT RESIDES.                                          RAM0770
C***  THE THIRD SYSTEM,X,Y, IS AN UPWIND, CROSSWIND COORDINATE SYSTEM     RAM0780
C***   WITH REFERENCE TO EACH RECEPTOR. THE X-AXIS IS DIRECTED UPWIND     RAM0790
C***   (SAME AS WIND DIRECTION FOR THE PERIOD). IN ORDER TO DETERMINE     RAM0800
C***   DISPERSION PARAMETER VALUES AND EVALUATE EQUATIONS FOR             RAM0810
C***   CONCENTRATIONS, DISTANCES IN THIS SYSTEM MUST BE IN KILOMETERS.    RAM0820
C***                                                                      RAM0830
C***READ CARDS 1-3, IDENTIFICATION FOR TITLES.                           RAM0840
      READ (IN,940) LINE1,LINE2,LINE3                                     RAM0850
      WRITE (IO,950) LINE1,LINE2,LINE3                                    RAM0860
C***MODL IS INDICATOR FOR URBAN VERSION.                                  RAM0870
      MODL=2                                                              RAM0880
      WRITE (IO,960)                                                      RAM0890
C***READ RAMQ OUTPUT FROM DISK OR TAPE; DATA IN INTERNAL UNITS.          RAM0900
      READ (NID) UNITS,CONTWO,CONONE,IPOL,NPT,IMPS,PNAME,IMOD             RAM0910
C***VERSION COMPATIBLE WITH RAMQ OUTPUT?                                  RAM0920
      IF (IMOD.EQ.MODL) GO TO 10                                          RAM0930
      WRITE (IO,1000) MODEL(IMOD),MODEL(MODL)                             RAM0940
      CALL EXIT                                                           RAM0950
C***CONTINUE READING DATA TRANSFERRED FROM RAMQ.                          RAM0960
10    DO 20 I=1,9                                                         RAM0970
20    READ (NID) (SOURCE(I,J),J=1,NPT)                                    RAM0980
      READ (NID) NAS,IMAS,RMIN,RMAX,SMIN,SMAX,IRSIZE,ISSIZE               RAM0990
      DO 30 I=1,6                                                         RAM1000
30    READ (NID) (ASORC(I,J),J=1,NAS)                                     RAM1010
      DO 40 I=1,IRSIZE                                                    RAM1020
40    READ (NID) (IA(I,J),J=1,ISSIZE)                                     RAM1030
C***                                                                      RAM1040
C***READ CARD 4.                                                          RAM1050
C***OPTION LIST***(SEE RUN STREAM EXAMPLES OF RAM FOR DETAILED            RAM1060
C***DESCRIPTION OF INPUT VARIABLES).                                      RAM1070
C***NAVG IS INTERMEDIATE AVERAGING TIME IN HOURS                          RAM1080
C***HAFL IS POLLUTANT HALF-LIFE IN SECONDS                                RAM1090
      READ (IN,970) IOPT,NPER,NAVG,Z,HAFL,NSIGP,NSIGA,IDATE,IHSTRT       RAM1100
      WRITE (IO,1030) (I,IOPT(I),I=1,13)                                  RAM1110
      TLOS=693./HAFL                                                      RAM1120
C***693. = 0.693*1000 METERS/KM, TLOS IN METERS/KM-SEC.                   RAM1130
      IF (NAVG.EQ.0) CALL EXIT                                            RAM1140
C***READ SFC MET. STATION ID AND 2-DIGIT YEAR,                            RAM1150
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C***MIXING HEIGHT STATION AND 2-DIGIT YEAR                                      RAM1160
C***ONLY IF MET DATA IS FROM RAMMET                                             RAM1170
      IF (IOPT(11).EQ.1) GO TO 60                                               RAM1180
C***READ CARD TYPE 5 UNLESS USING OPTION 11.                                    RAM1190
      READ (IN,970) ISFCD,ISFCYR,IMXD,IMXYR                                     RAM1200
C***THE ABOVE FORMAT IS UNIVACS FREE FIELD INPUT.                               RAM1210
C***VARIABLES MUST BE SEPARATED BY COMMAS.                                      RAM1220
C***THIS IS SIMILAR TO IBM'S LIST DIRECTED IO.                                  RAM1230
C***CHECK TO INSURE CORRECT SURFACE DATA, MIXING HT. DATA, AND                  RAM1240
C***PREPROCESSOR ARE BEING USED.                                                RAM1250
C***READ IDENTIFICATION RECORD FROM PREPROCESSED MET DISK OR TAPE FILE          RAM1260
      READ (NIT) ID,IYEAR,IDM,IYM                                               RAM1270
      IF (ISFCD.EQ.ID.AND.ISFCYR.EQ.IYEAR) GO TO 50                             RAM1280
      WRITE (IO,980) ISFCD,ISFCYR,ID,IYEAR                                      RAM1290
      CALL EXIT                                                                 RAM1300
50    IF (IMXD.EQ.IDM.AND.IMXYR.EQ.IYM) GO TO 60                                RAM1310
      WRITE (IO,990) IMXD,IMXYR,IDM,IYM                                         RAM1320
      CALL EXIT                                                                 RAM1330
60    IP=IPOL-2                                                                 RAM1340
      WRITE (IO,780) UNITS,CONONE,CONTWO,TITLE(IP),IPOL                         RAM1350
C***ECHO INPUT PARAMETERS                                                       RAM1360
      WRITE (IO,790) NPER,NAVG,IDATE(2),IDATE(1),IHSTRT,Z,HAFL                  RAM1370
      IF (IOPT(11).EQ.0) WRITE (IO,800) ISFCD,ISFCYR,IMXD,IMXYR                 RAM1380
      WRITE (IO,810)                                                            RAM1390
C***IOPT(1) CONTROL OPTION, POINT SOURCE INPUT? 0=NO, 1=YES.                    RAM1400
C***IF NO POINT SOURCES, SKIP DOWN TO AREA SOURCE CODE.                         RAM1410
      IF (IOPT(1).EQ.0) GO TO 150                                               RAM1420
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCE NUMBERS           RAM1430
C***0=NO, 1=YES.                                                                RAM1440
      IF (IOPT(12).EQ.0) GO TO 80                                               RAM1450
C***READ CARD TYPE 6 IF USING OPTIONS 1 AND 12.                                 RAM1460
C***READ THE NUMBER OF SIGNIFICANT POINT SOURCES THAT USER WANTS TO             RAM1470
C***SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.                       RAM1480
      READ (IN,870) INPT,(MPS(I),I=1,INPT)                                      RAM1490
      IF (INPT.EQ.0) GO TO 80                                                   RAM1500
      IF (MPS(INPT).EQ.0) WRITE (IO,880)                                        RAM1510
      J=INPT+1                                                                  RAM1520
      K=1                                                                       RAM1530
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST             RAM1540
C***IF NSIGP GREATER THAN INPT.                                                 RAM1550
      IF (J.GT.NSIGP) GO TO 100                                                 RAM1560
      DO 70 I=J,NSIGP                                                           RAM1570
      MPS(I)=IMPS(K)                                                            RAM1580
70    K=K+1                                                                     RAM1590
      GO TO 100                                                                 RAM1600
80    DO 90 I=1,NSIGP                                                           RAM1610
90    MPS(I)=IMPS(I)                                                            RAM1620
100   WRITE (IO,950) LINE1,LINE2,LINE3                                          RAM1630
      WRITE (IO,820) NPT,NSIGP,(IMPS(I),I=1,NSIGP)                              RAM1640
      WRITE (IO,1050)                                                           RAM1650
      IF (IOPT(13).EQ.0) GO TO 120                                              RAM1660
C***SAVE AVERAGE EMISSION RATE                                                  RAM1670
      DO 110 I=1,NPT                                                            RAM1680
110   PSAV(I)=SOURCE(IPOL,I)                                                    RAM1690
C***WRITE OUT POINT SOURCE LIST.                                                RAM1700
120   DO 130 I=1,NPT                                                            RAM1710
C***CONVERT TO USER UNITS FOR PRINT OUT.                                        RAM1720
      C1=SOURCE(1,I)*UNITS                                                      RAM1730
      C2=SOURCE(2,I)*UNITS                                                      RAM1740
      WRITE (IO,1060) I,(PNAME(L,I),L=1,2),C1,C2,(SOURCE(K,I),K=3,8)            RAM1750
      IPSIGS(I)=0                                                               RAM1760
130   CONTINUE                                                                  RAM1770
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C***FILL IN SIGNIFICANT [illegible]
      DO 140 I=1,NSIGA
      J=MAS(I)
140   IPSIGS(J)=1
C***IOPT(2) CONTROL OPTION, AREA SOURCE [illegible], 1=YES.
C***IF NO AREA SOURCES, SKIP [illegible]
150   IF (IOPT(2).EQ.0) GO TO [illegible]
C***READ CARD TYPE 7 [illegible]
      READ (IN,970) FH,[illegible]
      NHP=NHTS-1
      IF (NHP.LE.0) NHP=1
C***READ CARD TYPE 8 [illegible]
      READ (IN,970) (BPH(I),I=1,NHP)
C***CONVERT TO [illegible]
      C1=XMIN*UNITR
      C2=XMAX*UNITR
      C3=YMIN*UNITR
      C4=YMAX*UNITR
      C5=ALTR
      WRITE (IO,[illegible]) [illegible]
      XLIM=ALTR*[illegible]
      IF (ALTR.LT.[illegible]) GO TO [illegible]
      WRITE (IO,[illegible]) ALTR
      CALL EXIT
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT [illegible]
C*** 1=YES.
160   IF (IOPT(12).EQ.0) GO TO 180
C***READ THE NUMBER OF SIGNIFICANT AREA SOURCES THAT USER
C***WANTS TO SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.
C***READ CARD TYPE [illegible]
      READ (IN,970) INAS,(IMAS(I),I=1,INAS)
      IF (INAS.EQ.0) GO TO 180
      IF (MAS(INAS).EQ.0) WRITE (IO,[illegible])
      J=INAS+1
      K=1
      IF (J.GT.NSIGA) GO TO 200
      DO 170 I=J,NSIGA
      MAS(I)=IMAS(K)
170   K=K+1
      GO TO 200
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST
C***IF NSIGA GREATER THAN INAS.
180   DO 190 I=1,NSIGA
190   MAS(I)=IMAS(I)
200   WRITE (IO,830) NAS,NSIGA,(IMAS(I),I=1,NSIGA)
      WRITE (IO,840) NHTS,(HINT(I),I=1,NHTS)
      WRITE (IO,850) (BPH(I),I=1,NHP)
      WRITE (IO,860) FH,C5,C1,C2,C3,C4,IRSIZE,ISSIZE
C***IF IA ARRAY TOO LARGE TO BE PRINTED AS A MAP, PRINTING IS SKIPPED.
      IF (IRSIZE.GT.41) GO TO 220
C***PRINT OUT AREA SOURCE MAP ARRAY.
      WRITE (IO,1010)
      JLIM=ISSIZE+1
      DO 210 JDUM=1,ISSIZE
      J=JLIM-JDUM
210   WRITE (IO,1020) J,(IA(I,J),I=1,IRSIZE)
      WRITE (IO,1190) (I,I=1,IRSIZE)
      GO TO 230
220   WRITE (IO,930)
C***WRITE OUT THE AREA SOURCE LIST.
230   WRITE (IO,1070)
      DO 240 I=1,NAS
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C***CONVERT TO USER UNITS FOR PRINT OUT                                  RAM2400
      C1=ASORC(1,I)*UNITS                                                RAM2410
      C2=ASORC(2,I)*UNITS                                                RAM2420
      C3=ASORC(5,I)*UNITS                                                RAM2430
      WRITE (IO,1080) I,C1,C2,(ASORC(K,I),K=3,4),C3,ASORC(6,I)           RAM2440
C***SIDE LENGTH IS MULTIPLIED BY .5 TO SAVE TIME IN LATER COMPUTATIONS   RAM2450
      ASORC(5,I)=ASORC(5,I)*0.5                                          RAM2460
      IASIGS(I)=0                                                        RAM2470
240   CONTINUE                                                           RAM2480
C***FILL IN SIGNIFICANT AREA SOURCE MARKER ARRAY                         RAM2490
      DO 250 I=1,NSIGA                                                   RAM2500
      J=MAS(I)                                                           RAM2510
250   IASIGS(J)=I                                                        RAM2520
C***INPUT PERMANENT RECEPTORS                                            RAM2530
C***IOPT(3) CONTROL OPTION, SPECIFIED RECEPTORS?  0 = NO, 1 = YES.       RAM2540
260   IF (IOPT(3).EQ.0) GO TO 300                                        RAM2550
270   NRECEP=NRECEP+1                                                    RAM2560
      IF (NRECEP.GT.150) GO TO 280                                       RAM2570
C***READ COORDINATES IN USER UNITS                                       RAM2580
C***ATTENTION USER: DON'T SPECIFY A RECEPTOR AT ORIGIN AS A BLANK CARD   RAM2590
C***IS USED TO INDICATE ALL RECEPTORS HAVE BEEN READ.                    RAM2600
C***READ CARD TYPE 10 IF USING OPTION 3.                                 RAM2610
      READ (IN,1090) (RNAME(J,NRECEP),J=1,2),RREC(NRECEP),SREC(NRECEP)   RAM2620
C***BLANK CARD OR RECEPTOR AT ORIGIN SIGNALS ALL PERMANENT RECEPTORS      RAM2630
C***HAVE BEEN ENTERED.                                                   RAM2640
      IF (RREC(NRECEP)+SREC(NRECEP).LE.0.001) GO TO 280                  RAM2650
      GO TO 270                                                          RAM2660
280   NRECEP=NRECEP-1                                                    RAM2670
C***SAVE NUMBER OF PERMANENT RECEPTORS                                   RAM2680
      NPREC=NRECEP                                                       RAM2690
C***PRINT OUT TABLE OF PERMANENT RECEPTORS***                            RAM2700
      WRITE (IO,950) LINE1,LINE2,LINE3                                   RAM2710
      WRITE (IO,1100)                                                    RAM2720
C***THE CHARACTER "I" INDICATES THAT THESE RECEPTORS WERE INPUT INTO      RAM2730
C***THE MODEL.                                                           RAM2740
      DO 290 K=1,NRECEP                                                  RAM2750
      ITYPE(K)=ICHAR                                                     RAM2760
      WRITE (IO,1110) K,ITYPE(K),(RNAME(J,K),J=1,2),RREC(K),SREC(K)      RAM2770
C***CONVERT TO INTERNAL UNITS                                            RAM2780
      RREC(K)=RREC(K)/UNITS                                              RAM2790
      SREC(K)=SREC(K)/UNITS                                              RAM2800
290   ICODE(K)=0                                                         RAM2810
C***IF NEITHER POINT OR AREA SOURCES WERE SPECIFIED,EXIT PROGRAM.        RAM2820
300   IF ((IOPT(1)+IOPT(2)).NE.0) GO TO 310                              RAM2830
      WRITE (IO,1120)                                                    RAM2840
      CALL EXIT                                                          RAM2850
310   IDAY=IDATE(2)-1                                                    RAM2860
C***IOPT(11) CONTROL OPTION, INPUT MET DATA ON CARDS?  0=NO, 1=YES.      RAM2870
      IF (IDAY.LE.0.OR.IOPT(11).EQ.1) GO TO 330                          RAM2880
C***POSITION MET FILE TO CORRECT POSITION                                RAM2890
      DO 320 I=1,IDAY                                                    RAM2900
320   READ (NIT) JYR                                                     RAM2910
C***IOPT(6) CONTROL OPTION, FILL IN HONEYCOMB RECEPTORS? 0=NO, 1=YES.    RAM2920
330   IF (IOPT(6).EQ.0) GO TO 360                                        RAM2930
C***READ IN SPACING BETWEEN HONEYCOMB RECEPTORS AND VARIABLE HONEYCOMB   RAM2940
C***GRID BOUNDARIES IN USER UNITS.                                       RAM2950
C***USER CAN INPUT ZERO HERE FOR BOUNDARIES IF HE WANTS THE BOUNDARIES   RAM2960
C***OF THE AREA SOURCE REGION TO DEFINE THE AREA COVERED BY HONEYCOMB     RAM2970
C***RECEPTORS.                                                           RAM2980
C***READ CARD TYPE 11 IF USING OPTION 6.                                 RAM2990
      READ (IN,970) GRIDSP,HRMIN,HRMAX,HSMIN,HSMAX                      RAM3000
      IF (HRMAX.NE.0.0) GO TO 340                                        RAM3010
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C***RMIN,RMAX,SMIN,SMAX ARE IN INTERNAL UNITS                          RAM3020
      HRMIN=RMIN                                                       RAM3030
      HRMAX=RMAX                                                       RAM3040
      HSMIN=SMIN                                                       RAM3050
      HSMAX=SMAX                                                       RAM3060
      GO TO 350                                                        RAM3070
C***CONVERT INPUT GRID BOUNDARIES(USER UNITS) TO INTERNAL UNITS         RAM3080
340   HRMIN=HRMIN/UNITS                                                RAM3090
      HRMAX=HRMAX/UNITS                                                RAM3100
      HSMIN=HSMIN/UNITS                                                RAM3110
      HSMAX=HSMAX/UNITS                                                RAM3120
C***CONVERT GRIDSP FROM USER UNITS TO INTERNAL UNITS.                  RAM3130
350   GRIDSP=GRIDSP/UNITS                                              RAM3140
C***INITIALIZATION                                                     RAM3150
360   IDAY=IDAY+1                                                      RAM3160
      NHRS=0                                                           RAM3170
      IF (IOPT(11).EQ.1) GO TO 400                                     RAM3180
C***INPUT MET DATA FOR EACH DAY FROM DISK CREATED BY RAMMET,IOPT(11)=0 RAM3190
      READ (NIT) JYR,IMO,DAY1,IKST,QU,QTEMP,DUMR,QTHETA,HLH            RAM3200
      IF (JYR.NE.IDATE(1)) GO TO 370                                   RAM3210
      IDATE(2)=DAY1                                                    RAM3220
      IF (IDATE(2).EQ.IDAY) GO TO 380                                  RAM3230
C***DATE ON MET TAPE DOES NOT MATCH INTERNAL DATE                      RAM3240
370   WRITE (IO,740) JYR,IDATE(2),IDATE(1),IDAY                        RAM3250
      CALL EXIT                                                        RAM3260
C***MODIFY WIND VECTOR BY 180 DEGREES. SINCE FLOW VECTORS WERE OUTPUT  RAM3270
C***FROM RAMMET, THIS CONVERTS BACK TO WIND DIRECTIONS.                RAM3280
380   DO 390 IQ=1,24                                                   RAM3290
      IF (IKST(IQ).EQ.7) IKST(IQ)=6                                    RAM3300
      QTHETA(IQ)=QTHETA(IQ)+180.                                       RAM3310
      IF (QTHETA(IQ).GT.360.) QTHETA(IQ)=QTHETA(IQ)-360.               RAM3320
C***URBAN MIXING HEIGHTS ARE USED FOR THIS APPLICATION                 RAM3330
390   QHL(IQ)=HLH(2,IQ)                                                RAM3340
400   NB=IHSTRT                                                        RAM3350
      NE=NB+NAVG-1                                                     RAM3360
      IF (NB.GT.0) GO TO 410                                           RAM3370
      WRITE (IO,750) IHSTRT                                            RAM3380
      CALL EXIT                                                        RAM3390
410   WRITE (IO,950) LINE1,LINE2,LINE3                                 RAM3400
      U=0.0                                                            RAM3410
      TEMP=0.0                                                         RAM3420
      DELN=0.0                                                         RAM3430
      DELM=0.0                                                         RAM3440
      DO 420 I=1,7                                                     RAM3450
420   IFREQ(I)=0.0                                                     RAM3460
C***EACH AVERAGING PERIOD, THE NUMBER OF RECEPTORS IS RESET TO THE     RAM3470
C***NUMBER OF PERMANENT RECEPTORS.                                     RAM3480
      NRECEP=NPREC                                                     RAM3490
      DO 440 I=NB,NE                                                   RAM3500
      JHR=I                                                            RAM3510
      IF (IOPT(11).EQ.0) GO TO 430                                     RAM3520
C***READ MET DATA FROM CARDS WITH FREE FORMAT                          RAM3530
C***READ CARD TYPE 12 IF USING OPTION 11 ; JHR REDEFINED FROM METCARD. RAM3540
      READ (IN,970) JYR,DAY1,JHR,IKST(JHR),QU(JHR),QTEMP(JHR),QTHETA(JHR RAM3550
     1),QHL(JHR)                                                       RAM3560
      IF (I.NE.NB) GO TO 430                                           RAM3570
      IDATE(1)=JYR                                                     RAM3580
      IHSTRT=JHR                                                       RAM3590
      ISTDAY=DAY1                                                      RAM3600
      IDATE(2)=ISTDAY                                                  RAM3610
430   IF(I.EQ.NB) WRITE (IO,1130) IDATE                                RAM3620
      TRAD=QTHETA(JHR)*0.01745329                                      RAM3630
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      IF(IKST(JHR).EQ.7) IKST(JHR)=6                                    RAM3640
      WRITE (IO,1140) JHR,QTHETA(JHR),QU(JHR),QHL(JHR),QTEMP(JHR),IKST(J RAM3650
     1HR)                                                               RAM3660
      SINT=SIN(TRAD)                                                    RAM3670
      COST=COS(TRAD)                                                    RAM3680
C***CALCULATE WIND COMPONENTS                                           RAM3690
      URES=QU(JHR)                                                      RAM3700
      UR=URES*SINT                                                      RAM3710
      VR=URES*COST                                                      RAM3720
      DELM=DELM+UR                                                      RAM3730
      DELN=DELN+VR                                                      RAM3740
      TEMP=TEMP+QTEMP(JHR)                                              RAM3750
      U=U+URES                                                          RAM3760
      KST=IKST(JHR)                                                     RAM3770
440   IFREQ(KST)=IFREQ(KST)+1                                           RAM3780
C***REDEFINE NB AND NE IN CASE NON-CONSECUTIVE DAYS ARE BEING RUN       RAM3790
      IF(IOPT(11).EQ.0) GO TO 441                                       RAM3800
      NB=IHSTRT                                                         RAM3810
      NE=IHSTRT+NAVG-1                                                  RAM3820
C***CALCULATE RESULTANT  WIND DIRECTION THETA                           RAM3830
441   DELN=DELN/NAVG                                                    RAM3840
      DELM=DELM/NAVG                                                    RAM3850
      THETA=ANGARC(DELM,DELN)                                           RAM3860
C***CALCULATE AVERAGE AND RESULTANT SPEED                               RAM3870
      U=U/NAVG                                                          RAM3880
      TEMP=TEMP/NAVG                                                    RAM3890
      URES=SQRT(DELN*DELN+DELM*DELM)                                    RAM3900
      PERSIS=URES/U                                                     RAM3910
C***DETERMINE MODAL AND AVERAGE STABILITY                               RAM3920
      LSMAX=0                                                           RAM3930
      DO 450 I=1,7                                                      RAM3940
      LST=IFREQ(I)                                                      RAM3950
      IF (LST.LE.LSMAX) GO TO 450                                       RAM3960
      LSMAX=LST                                                         RAM3970
      LSTAB=I                                                           RAM3980
450   CONTINUE                                                          RAM3990
      IP1=LSTAB+1                                                       RAM4000
      KST=LSTAB                                                         RAM4010
      DO 460 I=IP1,7                                                    RAM4020
      IF (LSMAX.EQ.IFREQ(I)) GO TO 470                                  RAM4030
460   CONTINUE                                                          RAM4040
      GO TO 490                                                         RAM4050
C***IF TIE FOR MAX MODAL STABILITY CALCULATE AVERAGE STABILITY          RAM4060
470   KSUM=0                                                            RAM4070
      DO 480 J=1,7                                                      RAM4080
480   KSUM=KSUM+IFREQ(J)*J                                              RAM4090
      KST=FLOAT(KSUM)/FLOAT(NAVG)+0.5                                   RAM4100
C***OUTPUT RESULTANT MET CONDITIONS***                                  RAM4110
490   WRITE (IO,1150)                                                   RAM4120
      WRITE (IO,1160) THETA,URES,U,TEMP,PERSIS,KST                      RAM4130
      TRAD=THETA*0.01745329                                             RAM4140
      SINT=SIN(TRAD)                                                    RAM4150
      COST=COS(TRAD)                                                    RAM4160
C***DETERMINE RECEPTORS ACCORDING TO SIGNIFICANT SOURCES                RAM4170
C***IOPT(4)  CONTROL OPTION, SIGNIFICANT POINT RECEPTORS?   0=NO, 1=YES. RAM4180
C***IOPT(5)  CONTROL OPTION, SIGNIFICANT AREA RECEPTORS?    0=NO, 1=YES. RAM4190
      IF ((IOPT(4)+IOPT(5)).EQ.0) GO TO 500                             RAM4200
      CALL JMHREC                                                       RAM4210
C***FILL IN RECEPTORS WITH HONEYCOMB ARRAY                              RAM4220
C***IOPT(6) CONTROL OPTION, FILL IN HONEYCOMB RECEPTORS? 0 = NO, 1 = YES RAM4230
500   IF (IOPT(6).EQ.0) GO TO 510                                       RAM4240
      C1=HRMIN*UNITS                                                    RAM4250
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      C2=HRMAX*UNITS                                                    RAM4260
      C3=HSMIN*UNITS                                                    RAM4270
      C4=HSMAX*UNITS                                                    RAM4280
      C5=GRIDSP*UNITS                                                   RAM4290
      WRITE (IO,1170) C1,C2,C3,C4,C5                                    RAM4300
      CALL JMHHON (GRIDSP)                                              RAM4310
  510 IF (NRECEP.NE.0) GO TO 520                                        RAM4320
      WRITE (IO,1180)                                                   RAM4330
      CALL EXIT                                                         RAM4340
C***INITIALIZE CONCENTRATION SUMS                                       RAM4350
C***IF SIGNIFICANT OR HONEYCOMB RECEPTORS,WRITE CAUTIONING STATEMENT.   RAM4360
  520 IF ((IOPT(4)+IOPT(5)+IOPT(6)).GT.0) WRITE (IO,900)               RAM4370
C***INITIALIZE FOR AVERAGING TIME                                       RAM4380
      DO 550 K=1,NRECEP                                                 RAM4390
      ACHI(K)=0.0                                                       RAM4400
      PCHI(K)=0.0                                                       RAM4410
      DO 530 I=1,11                                                     RAM4420
  530 ASIGS(K,I)=0.0                                                    RAM4430
      DO 540 I=1,26                                                     RAM4440
  540 PSIGS(K,I)=0.0                                                    RAM4450
  550 CONTINUE                                                          RAM4460
C***IF SAVING PARTIAL CONCENTRATIONS, WRITE NOS. OF RECEPTORS  SOURCES. RAM4470
      IF (IOPT(8).EQ.0) GO TO 570                                       RAM4480
      DO 560 I=1,NRECEP                                                 RAM4490
      URREC(I)=RREC(I)*UNITS                                            RAM4500
      USREC(I)=SREC(I)*UNITS                                            RAM4510
  560 CONTINUE                                                          RAM4520
      WRITE (KIP) NRECEP,NAS,NPT,(URREC(I),I=1,NRECEP),(USREC(I),I=1,NRE RAM4530
     1CEP)                                                              RAM4540
C***                                                                    RAM4550
C***LOOP ON HOURS                                                       RAM4560
C***                                                                    RAM4570
  570 DO 700 ILH=NB,NE                                                  RAM4580
      LH=ILH                                                            RAM4590
      IF (LH.LE.24) GO TO 580                                           RAM4600
      LH=MOD(ILH,24)                                                    RAM4610
      IF (LH.EQ.1) IDATE(2)=DAY1                                        RAM4620
C***INITIALIZE HOURLY ARRAYS                                            RAM4630
  580 DO 610 K=1,NRECEP                                                 RAM4640
      AHCHI(K)=0.0                                                      RAM4650
      PHCHI(K)=0.0                                                      RAM4660
      DO 590 I=1,11                                                     RAM4670
  590 AHSIGS(K,I)=0.0                                                   RAM4680
      DO 600 I=1,26                                                     RAM4690
  600 PHSIGS(K,I)=0.0                                                   RAM4700
  610 CONTINUE                                                          RAM4710
C***SET MET CONDITIONS FOR THIS HOUR***                                 RAM4720
      THETA=QTHETA(LH)                                                  RAM4730
      U=QU(LH)                                                          RAM4740
      HL=QHL(LH)                                                        RAM4750
      TEMP=QTEMP(LH)                                                    RAM4760
      KST=IKST(LH)                                                      RAM4770
C***DETERMINE WIND DIRECTION CONTROL, IWD, 90 DEG. QUADRANT OF WIND     RAM4780
C***                                                                    RAM4790
      DO 620 I=1,3                                                      RAM4800
      IF (THETA.LE.DEG(I)) GO TO 630                                    RAM4810
  620 CONTINUE                                                          RAM4820
      I=4                                                               RAM4830
  630 IWD=I                                                             RAM4840
      TRAD=THETA*0.01745329                                             RAM4850
      SINT=SIN(TRAD)                                                    RAM4860
      COST=COS(TRAD)                                                    RAM4870
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C***CHECK FOR POINT SOURCES                                                    RAM4880
      IF (IOPT(1).NE.1) GO TO 650                                              RAM4890
C***IOPT(13) CONTROL OPTION, HOURLY EMISSIONS INPUT? 0=NO, 1=YES               RAM4900
      IF (IOPT(13).EQ.0) GO TO 640                                             RAM4910
      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                                     RAM4920
C***READ HOURLY POINT SOURCE RECORD                                            RAM4930
      READ (15) IDATP,(SOURCE(IPOL,I),I=1,NPT)                                 RAM4940
C***CHECK DATE                                                                 RAM4950
      IF (IDCK.EQ.IDATP) GO TO 640                                             RAM4960
      WRITE (IO,910) IDCK,IDATP                                                RAM4970
      CALL EXIT                                                                RAM4980
C***CALCULATE POINT SOURCE CONTRIBUTIONS                                       RAM4990
640   CALL JMHPTU (HSAV,DSAV,Z,TLOS,LH)                                        RAM5000
C***CHECK FOR AREA SOURCES                                                     RAM5010
650   IF (IOPT(2).NE.1) GO TO 690                                              RAM5020
C***IOPT(13) CONTROL OPTION, HOURLY EMISSION INPUT? 0=NO, 1=YES                RAM5030
      IF (IOPT(13).EQ.0) GO TO 680                                             RAM5040
      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                                     RAM5050
C***READ HOURLY AREA SOURCE EMISSION RECORD                                    RAM5060
      READ (16) IDATA,(ASORC(IPOL,I),I=1,NAS)                                  RAM5070
C***CHECK DATE                                                                 RAM5080
      IF (IDCK.EQ.IDATA) GO TO 660                                             RAM5090
      WRITE (IO,920) IDCK,IDATA                                                RAM5100
      CALL EXIT                                                                RAM5110
C***CONVERT HOURLY AREA EMISSIONS FROM G/SEC TO G/SQ. M/SEC                    RAM5120
660   DO 670 I=1,NAS                                                           RAM5130
C***CONVERT SIDE LENGTH TO METERS.                                             RAM5140
C***NOTE: SIDE LENGTH HAD BEEN MULTIPLIED BY .5 ABOVE FOR TIME                 RAM5150
C***CONSIDERATIONS                                                             RAM5160
      SF=ASORC(5,I)*2000*CONTWO                                                RAM5170
670   ASORC(IPOL,I)=ASORC(IPOL,I)/(SF*SF)                                      RAM5180
C***SET UP INTEGRATION TABLES FOR AREA SOURCE CALCULATIONS***                  RAM5190
680   CALL JMH54U (NHTS,Z,XLIM,TLOS)                                           RAM5200
C***CALCULATE AREA SOURCE CONTRIBUTIONS                                        RAM5210
      CALL JMHARE (NHTS,XLIM,LH)                                               RAM5220
C***OUTPUT RESULTS EACH HOUR                                                   RAM5230
C***IOPT(7) CONTROL OPTION, HOURLY OUTPUT? 0 = NO, 1 = YES.                    RAM5240
690   IF (IOPT(7).EQ.0) GO TO 700                                              RAM5250
      CALL JMHOUR (LH,LINE1,LINE2,LINE3)                                       RAM5260
700   CONTINUE                                                                 RAM5270
      IF(NE.GT.24) IDATE(2)=ISTDAY                                             RAM5280
C***OUTPUT FINAL RESULTS                                                       RAM5290
      CALL JMHFIN (NB,LINE1,LINE2,LINE3)                                       RAM5300
      NP=NP+1                                                                  RAM5310
      NHRS=NHRS+NAVG                                                           RAM5320
      IF(NP.GE.NPER) GO TO 720                                                 RAM5330
      IF(NHRS.GE.24) GO TO 360                                                 RAM5340
710   NB=NB+NAVG                                                               RAM5350
      NE=NE+NAVG                                                               RAM5360
      IF(NB.LE.24) GO TO 410                                                   RAM5370
      NB=MOD(NB,24)                                                            RAM5380
      NE=NB+NAVG-1                                                             RAM5390
      GO TO 410                                                                RAM5400
C***IOPT(8) CONTROL OPTION, SOURCE CONTRIBUTIONS TO DISK? 0=NO, 1=YES.         RAM5410
720   IF (IOPT(8).EQ.0) GO TO 730                                              RAM5420
      END FILE NIP                                                             RAM5430
      END FILE NIP                                                             RAM5440
730   CALL EXIT                                                                RAM5450
C                                                                              RAM5460
740   FORMAT (' DATE ON MET. TAPE, ',I2,I3,' ,DOES NOT MATCH INTERNAL DA       RAM5470
     1TE, ',I2,I3)                                                             RAM5480
750   FORMAT (' HOUR ',I3,' IS NOT PERMITTED. HOURS MUST BE DEFINED BETW       RAM5490
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     1EEN 1 AND 24')                                                        RAM5500
780   FORMAT (1X,T21,'GENERAL INFORMATION FROM RAMQ'//2X,'UNITS - THERE     RAM5510
     1ARE',F14.7,' USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUA    RAM5520
     2RE SIDE LENGTH (INTERNAL UNIT)'/2X,'CONONE - THERE ARE',F14.7,' KI    RAM5530
     3LOMETERS PER USER UNIT'/2X,'CONTWO - IT IS CALCULATED THAT THERE A    RAM5540
     4RE',F14.7,' KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH    RAM5550
     5 (INTERNAL UNIT)'/2X,'THIS RUN IS FOR ',A6,'SINCE IPOL=',I2//1X)      RAM5560
790   FORMAT (1X,T21,'GENERAL INPUT DATA'//2X,'NUMBER OF PERIODS TO BE S    RAM5570
     1IMULATED(NPER)= ',I3/2X,'AVERAGING TIME IN HOURS FOR EACH PERIOD(N    RAM5580
     2AVG)= ',I5/2X,'STARTING DATE(IDATE(2),IDATE(1),IHSTRT): JULIAN DAY    RAM5590
     3 ',I4,', YEAR 19',I2,' HOUR= ',I2/2X,'RECEPTOR HEIGHT FOR ALL RECE    RAM5600
     4PTORS(Z) ',F6.3,' METERS'/2X,'ASSUMED POLLUTANT HALF-LIFE(HAFL) ',    RAM5610
     5F10.2,' SECONDS')                                                     RAM5620
800   FORMAT (2X,'SURFACE MET DATA FROM STATION(ISFCD) ',I6,', YEAR(ISFC     RAM5630
     1YR) 19',I2/2X,'MIXING HEIGHT DATA FROM STATION(IMXD) ',I6,', YEAR(    RAM5640
     2IMXYR) 19',I2)                                                        RAM5650
810   FORMAT (//1X)                                                        RAM5660
820   FORMAT ('0',T21,'POINT SOURCE INFORMATION'//2X,'EMISSION INFORMATI    RAM5670
     1ON FOR ',I4,' (NPT) POINT SOURCES HAS BEEN DETERMINED BY RAMQ'/2X,    RAM5680
     2I2,' SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN'    RAM5690
     3/2X,'THE ORDER OF SIGNIFICANCE(IMPS) FOR 25 OR LESS POINT SOURCES     RAM5700
     4DETERMINED BY RAMQ IS LISTED BY POINT SOURCE NUMBER:'/2X,25I5)        RAM5710
830   FORMAT (//1X,T21,'AREA SOURCE INFORMATION'//2X,'EMISSION INFORMATI    RAM5720
     1ON FOR ',I4,' (NAS) AREA SOURCES HAS BEEN DETERMINED BY RAMQ'/2X,I    RAM5730
     22,' SIGNIFICANT AREA SOURCES(NSIGA) ARE TO BE USED FOR THIS RUN'/2    RAM5740
     3X,' THE ORDER OF SIGNIFICANCE(IMAS) FOR 10 OR LESS  AREA SOURCES D    RAM5750
     4ETERMINED BY RAMQ IS LISTED BY  AREA SOURCE NUMBER:'/2X,10I5)         RAM5760
840   FORMAT (2X,'NUMBER OF AREA HEIGHT CLASSES(NHTS)=',I2/2X,'REPRESENT    RAM5770
     1ATIVE AREA SOURCE HEIGHTS FOR EACH HEIGHT CLASS(HINT) IN METERS=',    RAM5780
     23F10.2)                                                               RAM5790
850   FORMAT (2X,'BREAK POINT HEIGHT BETWEEN THE AREA HEIGHT CLASSES(BPH    RAM5800
     1) IN METERS=',2F10.2)                                                 RAM5810
860   FORMAT (2X,'FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGH    RAM5820
     1T(FH)=',F10.3/2X,'LIMIT OF DISTANCE FOR AREA SOURCE INTEGRATION TA    RAM5830
     2BLES(XLIM) IN USER UNITS =',F10.3/2X,'BOUNDARIES OF THE AREA SOURC    RAM5840
     3E GRID IN USER UNITS:'/1X,T6,'RMIN=',F10.3,5X,'RMAX=',F10.3,5X,'SM    RAM5850
     4IN=',F10.3,5X,'SMAX=',F10.3/2X,'SIZE(IRSIZE X ISSIZE) OF AREA SOUR    RAM5860
     5CE MAP ARRAY(IA) IN INTERNAL UNITS =',I3,' EAST-WEST BY ',I3,' NOR    RAM5870
     6TH-SOUTH'//1X)                                                        RAM5880
870   FORMAT (26I3)                                                        RAM5890
880   FORMAT (' ***ERROR IN SPECIFYING SIGNIF. POINT SOURCES***')          RAM5900
890   FORMAT (' ***ERROR IN SPECIFYING SIGNIF. AREA SOURCES***')           RAM5910
900   FORMAT (' ***PLEASE NOTE: THE RECEPTOR NUMBERS AND LOCATIONS GENER    RAM5920
     1ATED FOR THIS AVERAGING TIME PERIOD ARE DIFFERENT FROM THOSE GENER    RAM5930
     2ATED FOR'/18X,' THE PRECEEDING AVERAGING PERIOD.***')                 RAM5940
910   FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY POINT E    RAM5950
     1MISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')     RAM5960
920   FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY AREA EM    RAM5970
     1ISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')      RAM5980
930   FORMAT (' AREA ARRAY IS TOO WIDE FOR PAGE SIZE, THEREFORE WILL NOT    RAM5990
     1 BE PRINTED.')                                                        RAM6000
940   FORMAT (13A6,A2/13A6,A2/13A6,A2)                                     RAM6010
950   FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                           RAM6020
960   FORMAT ('0THIS IS THE NORMAL URBAN VERSION(78124) OF RAM FOR APPLI    RAM6030
     1CATION TO ONE OR SEVERAL DAYS DATA.'/1X)                              RAM6040
970   FORMAT ()                                                            RAM6050
980   FORMAT (' SURFACE DATA IDENTIFERS READ INTO MODEL (STATION=',I5,'     RAM6060
     1,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X,    RAM6070
     2' (STATION=',I5,' ,YEAR=',I2)                                         RAM6080
990   FORMAT (' MIXING HEIGHT IDENTIFERS READ INTO MODEL (STATION=',I5,'     RAM6090
     1 ,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X     RAM6100
     2,' (STATION=',I5,' ,YEAR=',I2)                                        RAM6110
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 1000 FORMAT (' *** THE ',A6,'VERSION OF THE PREPROCESSOR CAN NOT BE US RAM6120
     1ED WITH THE ',A6,'VERSION OF THE MODEL***')                       RAM6130
 1010 FORMAT ('0',T12,'AREA SOURCE MAP ARRAY(IA)'/1X)                   RAM6140
 1020 FORMAT (1X,I3,2X,41I3/1X)                                         RAM6150
 1030 FORMAT (1X,T3,'OPTION  ',T16,'OPTION LIST',T46,'OPTION SPECIFICATI RAM6160
     1ON : 0= IGNORE OPTION'/1X,T66,' 1= USE OPTION'/1X,T7,I2,T16,'POINT RAM6170
     2 SOURCE DATA',T51,I1/1X,T7,I2,T16,'AREA SOURCE DATA',T51,I1/1X,T7, RAM6180
     3I2,T16,'PERMANENT RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT POIN RAM6190
     4T RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT AREA RECEPTORS',T51, RAM6200
     5I1/1X,T7,I2,T16,'HONEYCOMB RECEPTORS',T51,I1/1X,T7,I2,T16,'HOURLY  RAM6210
     6OUTPUT',T51,I1/1X,T7,I2,T16,'PARTIAL CONC. WRITTEN TO DISK/TAPE',T RAM6220
     751,I1/1X,T7,I2,T16,'PRINT ONLY SUMMARY HOURLY OUTPUT',,T51,I1/1X,T RAM6230
     87,I2,T16,'PUNCH CARDS FOR CONTOURS',T51,I1/1X,T7,I2,T16,'READ MET  RAM6240
     9DATA FROM CARDS',T51,I1/1X,T7,I2,T16,'SPECIFY SIGNIFICANT SOURCE N RAM6250
     AUMBERS',T51,I1/1X,T7,I2,T16,'READ HOURLY EMISSIONS',T51,I1/1X)    RAM6260
 1040 FORMAT (' THE INPUT LIMIT OF MAX DISTANCE FOR AREA INTEGRATION ',' RAM6270
     1 CONVERTS TO ',F10.3,' KM WHICH EXCEEDS STORAGE ','LIMITATIONS. UP RAM6280
     2 TO 116 KM DISTANCES ARE ALLOWED.')                               RAM6290
 1050 FORMAT ('0',T50,'POINT SOURCE LISTING'//1X,T6,'SOURCE',T25,'EAST', RAM6300
     1T33,'NORTH',T40,'SO2(G/SEC)  PART(G/SEC)  STACK  STACK   STACK     RAM6310
     2 STACK'/1X,T25,'COORD',T33,'COORD  EMISSIONS   EMISSIONS   HT(M)  RAM6320
     3 TEMP(K) ','DIAM(M) VEL(M/SEC)'/1X,T26,'(USER UNITS)'/1X)         RAM6330
 1060 FORMAT (1X,I3,I3,1X,2A6,2X,2F9.2,F10.2,F11.2,2X,4F8.2)            RAM6340
 1070 FORMAT (1X,T20,'AREA SOURCE LISTING'//1X,T2,'SOURCE',T10,'EAST',T RAM6350
     119,'NORTH',T28,'SO2(G/SEC-M**2)',T44,'PART(G/SEC-M**2)  SIDE      RAM6360
     2 EFFECTIVE'/1X,T10,'COORD   COORD',T29,'EMISSIONS',T46,'EMISSIONS', RAM6370
     3T61,'LENGTH    HEIGHT'/1X,T11,'(USER UNITS)',T58,'(USER UNITS)',T7 RAM6380
     46,'(M)'/1X)                                                       RAM6390
 1080 FORMAT (1X,I3,I3,2X,2F9.1,3X,1PE11.4,7X,1PE11.4,3X,0PF7.1,3X,F7.1) RAM6400
 1090 FORMAT (2A4,2F10.3)                                               RAM6410
 1100 FORMAT ('0',T9,'INPUT RECEPTORS'//1X,'RECEPTOR    IDENTIFICATION  RAM6420
     1EAST      NORTH    '/1X,T30,'COORD',T39,'COORD'/1X,T31,'(USER UNITS RAM6430
     2)'/1X)                                                            RAM6440
 1110 FORMAT (1X,T4,I2,1X,A1,8X,2A4,7X,F6.2,3X,F7.2)                    RAM6450
 1120 FORMAT (1X,'NO SOURCES SPECIFIED')                                RAM6460
 1130 FORMAT ('0INPUT MET DATA  ',I2,'/',I4/1X,T2,'HOUR   THETA   SPEED RAM6470
     1   MIXING   TEMP       STABILITY'/1X,T9,'(DEG)    (M/S)  HEIGHT(M) ( RAM6480
     2DEG-K)  CLASS'/1X)                                                RAM6490
 1140 FORMAT (1X,I3,I7,4F9.2,6X,I1)                                     RAM6500
 1150 FORMAT ('0','RESULTANT MET CONDITIONS'/1X)                        RAM6510
 1160 FORMAT (2X,'WIND DIRECTION=',F7.2,T36,'RESULTANT WIND SPEED=',F7.2 RAM6520
     1/2X,'AVERAGE WIND SPEED=',F7.2,T36,'AVERAGE TEMP=',F7.2/2X,'WIND P RAM6530
     2ERSISTANCE=',F6.3,T36,'MODAL STABILITY=',I2)                      RAM6540
 1170 FORMAT ('0',T20,'GENERATED HONEYCOMB RECEPTORS'/1X,/1X,'THE AREA T RAM6550
     1O BE COVERED BY HONEYCOMB RECEPTORS IS BOUNDED BY:'/1X,' RMIN=',F1 RAM6560
     20.3,' RMAX=',F10.3,' SMIN=',F10.3,' SMAX=',F10.3//1X,'DISTANCE BET RAM6570
     3WEEN HONEYCOMB RECEPTORS(GRIDSP) IN USER UNITS=',F7.3//1X,'RECEPTO RAM6580
     4R    EAST      NORTH')                                            RAM6590
 1180 FORMAT (1X,'NO RECEPTORS HAVE BEEN CHOSEN')                       RAM6600
 1190 FORMAT (/6X,41I3/1X)                                              RAM6610
C                                                                       RAM6620
      END                                                               RAM6630


      FUNCTION ANGARC (DELM,DELN)                                       ANG0010
C        DETERMINES APPROPRIATE ANGLE OF TAN(ANG) = DELM/DELN           ANG0020
C        WHICH IS REQUIRED FOR CALCULATION OF RESULTANT WIND DIRECTION. ANG0030
C        DELM IS THE AVERAGE WIND COMPONENT IN THE EAST DIRECTION.      ANG0040
C        DELN IS THE AVERAGE WIND COMPONENT IN THE NORTH DIRECTION.     ANG0050
C        NO COMMON REQUIREMENT, NO ARRAYS, USES LIBRARY FUNCTION ATAN   ANG0060
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      IF (DELN) 10,40,80                                                ANG0070
10    IF (DELM) 20,30,20                                                ANG0080
20    ANGARC=57.29578*ATAN(DELM/DELN)+180.                              ANG0090
      RETURN                                                            ANG0100
30    ANGARC=180.                                                       ANG0110
      RETURN                                                            ANG0120
40    IF (DELM) 50,60,70                                                ANG0130
50    ANGARC=270.                                                       ANG0140
      RETURN                                                            ANG0150
60    ANGARC=0.                                                         ANG0160
C     ANGARC=0. INDICATES INDETERMINATE ANGLE                           ANG0170
      RETURN                                                            ANG0180
70    ANGARC=090.                                                       ANG0190
      RETURN                                                            ANG0200
80    IF (DELM) 90,100,110                                              ANG0210
90    ANGARC=57.29578*ATAN(DELM/DELN)+360.                              ANG0220
      RETURN                                                            ANG0230
100   ANGARC=360.                                                       ANG0240
      RETURN                                                            ANG0250
110   ANGARC=57.29578*ATAN(DELM/DELN)                                   ANG0260
      RETURN                                                            ANG0270
C                                                                       ANG0280
      END                                                               ANG0290
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      SUBROUTINE JMHPOL (X,IH,CONC,NS,KREC,XLIM)                        POL0010
C      INTERPOLATE FROM PRECALCULATED AREA TABLES.                      POL0020
C***THIS SUBROUTINE INTERPOLATES FROM A TABLE OF INTEGRATED VALUES       POL0030
C***TO DETERMINE THE CONCENTRATION AT A RECEPTOR FROM AN AREA SOURCE AT  POL0040
C***A GIVEN DISTANCE AND HEIGHT                                         POL0050
C      INPUT VARIBALES ARE...                                           POL0060
C         X - UPWIND DISTANCE IN KM.                                    POL0070
C         IH - THE HEIGHT INDEX.                                        POL0080
C         CONC - RELATIVE CONC. NORMALIZED FOR WIND SPEED, CHI*U/Q.     POL0090
C         NS - CURRENT SOURCE NUMBER                                    POL0100
C         KREC - CURRENT RECEPTOR NUMBER                                POL0110
C         XLIM - MAXIMUM DISTANCE FOR INTERPOLATION IN AREA TABLES      POL0120
      COMMON /RELC/ CIN(3,200)                                          POL0130
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                   POL0140
      IF (X.LT.0.01) GO TO 50                                           POL0150
      IF (X.GE.0.5) GO TO 10                                            POL0160
C***FOR DISTANCES < 500M, CONC. WAS STORED EVERY 10M.                   POL0170
C***STORAGE LOCATIONS 1-50 CONTAIN INTEGRATED CONC. FOR 10 TO 500M.     POL0180
      J=100.*X                                                          POL0190
      D=J                                                               POL0200
      XL=D/100.                                                         POL0210
      XU=XL+0.01                                                        POL0220
      GO TO 40                                                          POL0230
10    IF (X.GE.3.) GO TO 20                                             POL0240
C***FOR DISTANCES  FROM 500 TO 3,000KM CONC. WAS STORED EVERY 100M.     POL0250
C***STORAGE LOCATIONS 50-75 CONTAIN INTEGRATED CONC. FOR 0.5 TO 3. KM.  POL0260
      J=IFIX(10.*X)+45                                                  POL0270
      D=J-45                                                            POL0280
      XL=D/10.                                                          POL0290
      XU=XL+0.1                                                         POL0300
      GO TO 40                                                          POL0310
20    IF (X.GE.15.) GO TO 30                                            POL0320
C***FOR DISTANCES 3 TO 15 KM,  CONC. WAS STORED EVERY 500M.             POL0330
C***STORAGE LOCATIONS 75-99 CONTAIN INTEGRATED CONC. FOR 3 TO 15 KM.    POL0340
      J=IFIX(2.*X)+69                                                   POL0350
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      D=J-69                                                            POL0360
      XL=D/2.                                                           POL0370
      XU=XL+0.5                                                         POL0380
      GO TO 40                                                          POL0390
C***FOR DISTANCES > 15,000M CONC. WAS STORED EVERY 1000M.               POL0400
C***STORAGE LOCATIONS 99-200 CONTAIN INTEGRATED CONC. FOR 15 TO 116KM.  POL0410
30    IF (X.GT.XLIM) GO TO 60                                           POL0420
      J=IFIX(X)+84                                                      POL0430
      XL=J-84                                                           POL0440
      XU=XL+1.                                                          POL0450
40    K=J+1                                                             POL0460
C***RETRIEVE CONCENTRATIONS FOR INTERPOLATION ACCORDING TO HEIGHT CLASS POL0470
C***AND DISTANCE OUT.                                                   POL0480
      C1=CIN(IH,J)                                                      POL0490
      CONC=C1+((X-XL)/(XU-XL))*(CIN(IH,K)-C1)                           POL0500
      RETURN                                                            POL0510
C***FOR DISTANCES < 100M, CONC. WAS STORED IN CIN EVERY 10 M.           POL0520
C***STORAGE LOCATION 1 CONTAINS INTEGRATED CONC. FOR 10 M.              POL0530
50    CONC=100.*X*CIN(IH,1)                                             POL0540
      RETURN                                                            POL0550
60    WRITE (IO,70) XLIM,NS,KREC                                        POL0560
      CALL EXIT                                                         POL0570
C                                                                       POL0580
70    FORMAT (' ***THE INPUT VALUE OF XLIM,',F10.2,', IS SMALLER THAN TH POL0590
     1E CALCULATED DISTANCE FROM AREA SOURCE ',I4,' TO RECEPTOR ',I4,'** POL0600
     2*'/1X,'PLEASE REDEFINE XLIM')                                     POL0610
C                                                                       POL0620
      END                                                               POL0630
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      SUBROUTINE JMHARE (NHTS,XLIM,LH)                                  ARE0010
C***THE FUNCTION OF THIS SUBROUTINE IS TO CALCULATE THE CONCENTRATIONS   ARE0020
C***AT EACH RECEPTOR DUE TO AREA SOURCES. THE HANNAH TECHNIQUE           ARE0030
C***IS USED TO EXAMINE THE AREA SOURCES ALONG AN UPWIND LINE FROM        ARE0040
C***THE RECEPTOR. SUBROUTINE JMHPOL IS CALLED TO INTERPOLATE CONC.      ARE0050
C        INPUT VARIABLES ARE ...                                        ARE0060
C        NHTS- THE NUMBER OF AREA SOURCE HEIGHTS.                       ARE0070
C        XLIM- DISTANCE LIMIT ON AREA INTEGRATION                       ARE0080
C        IDATE - YEAR AND JULIAN DAY(IN COMMON/METDAT/)                 ARE0090
C        LH- HOUR                                                       ARE0100
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR ARE0110
     1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S ARE0120
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)  ARE0130
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA ARE0140
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR ARE0150
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)  ARE0160
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE ARE0170
     1(2)                                                               ARE0180
      COMMON /HEIGHT/ HINT(3),HARE(3),BPEM(2),FH                        ARE0190
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                   ARE0200
      DIMENSION ADELR(4), ADELS(4)                                      ARE0210
      DATA ADELR /0.001,0.001,-0.001,-0.001/                            ARE0220
      DATA ADELS /0.001,-0.001,-0.001,0.001/                            ARE0230
C***CALCULATING MODIFIED BREAK-POINT HEIGHTS, IF NECESSARY              ARE0240
      DO 10 IH=1,2                                                      ARE0250
      H=BPH(IH)                                                         ARE0260
      BPHM(IH)=H                                                        ARE0270
      IF (FH.EQ.1.) GO TO 10                                            ARE0280
      PHT=FH*H                                                          ARE0290
      UPL=U*(PHT/10.)**PL(KST)                                          ARE0300
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      IF (UPL.LT.1.) UPL=1.                                                  ARE0310
      BPHM(IH)=((H-PHT)*5.)/UPL+PHT                                          ARE0320
10    CONTINUE                                                               ARE0330
C***DELR: SMALL EAST-WEST INCREMENT DEPENDENT ON WIND DIRECTION              ARE0340
C***USED TO STEP INTO NEXT UPWIND AREA SOURCE.                               ARE0350
      DELR=ADELR(IWD)                                                        ARE0360
C***DELS: SMALL NORTH-SOUTH INCREMENT DEPENDENT ON WIND DIRECTION            ARE0370
C***USED TO STEP INTO NEXT UPWIND AREA SOURCE                                ARE0380
      DELS=ADELS(IWD)                                                        ARE0390
C***SUBTRACTION OF 1 SO THAT POINT IN SOUTHWEST CORNER OF AREA SOURCE        ARE0400
C***REGION WILL HAVE IA INDEX OF (1,1).                                      ARE0410
      RMINI=RMIN-1.                                                          ARE0420
      SMINI=SMIN-1.                                                          ARE0430
C***                                                                         ARE0440
C***LOOP ON RECEPTORS                                                        ARE0450
C***UNITS FOR GEOMETRIC CALCULATIONS ARE INTERNAL UNITS.                     ARE0460
      DO 310 K=1,NRECP                                                       ARE0470
C***ZERO PARTIAL CONCENTRATION ARRAY                                         ARE0480
      DO 20 I=1,NAS                                                          ARE0490
20    PARTC(I)=0.0                                                           ARE0500
      XL=0.0                                                                 ARE0510
      CONCL=0.0                                                              ARE0520
      IHL=0                                                                  ARE0530
C***SEARCH FOR UPWIND AREA SOURCES WHICH CONTRIBUTE TO THE K-TH              ARE0540
C***RECEPTOR, BEGINNING AT THE K-TH RECEPTOR LOCATION.                       ARE0550
      RRE=RREC(K)                                                            ARE0560
      SRE=SREC(K)                                                            ARE0570
C***SUBTRACT MINIMUM AND STEP UPWIND INTO AREA SOURCE,                       ARE0580
C***THEN INTEGERIZE TO ACCESS SOURCE NUMBER IN IA ARRAY.                     ARE0590
      IR=RRE-RMINI+DELR                                                      ARE0600
      IS=SRE-SMINI+DELS                                                      ARE0610
C***  IS RECEPTOR WITHIN DEFINED LIMITS ***                                  ARE0620
      IF ((RRE.LE.RMIN).OR.(RRE.GE.RMAX)) GO TO 230                          ARE0630
      IF ((SRE.LE.SMIN).OR.(SRE.GE.SMAX)) GO TO 230                          ARE0640
C***                                                                         ARE0650
C***RECEPTOR IS WITHIN AREA SOURCE REGION.                                   ARE0660
C***                                                                         ARE0670
C***DETERMINE SOURCE NUMBER,NS, SOURCE CENTER(RC,SC),                        ARE0680
C***HALF OF SOURCE SIDE LENGTH,D, SOURCE STRENGTH,QA, AND SOURCE HEIGHT,     ARE0690
C***HA.                                                                      ARE0700
30    IF ((IR.LE.0).OR.(IR.GT.IRSIZE)) GO TO 300                             ARE0710
      IF ((IS.LE.0).OR.(IS.GT.ISSIZE)) GO TO 300                             ARE0720
      NS=IA(IR,IS)                                                           ARE0730
C***SKIP HEIGHT CALCULATIONS IF NS = 0.                                      ARE0740
      IF (NS.EQ.0) GO TO 60                                                  ARE0750
      D=ASORC(5,NS)                                                          ARE0760
      RC=ASORC(1,NS)+D                                                       ARE0770
      SC=ASORC(2,NS)+D                                                       ARE0780
      QA=ASORC(IPOL,NS)                                                      ARE0790
      HA=ASORC(6,NS)                                                         ARE0800
      IF (QA.LE.0.0) GO TO 70                                                ARE0810
C***USE POWER LAW DEPENDENT ON STABILITY CLASS TO MODIFY WIND SPEED          ARE0820
C***AT EFFECTIVE HEIGHT OF STACK.                                            ARE0830
C*** VARY EFFECTIVE HEIGHT(M) ACCORDING TO WIND SPEED                        ARE0840
C***HA- EFFECTIVE AREA SOURCE HEIGHT(M)                                      ARE0850
C***FH- FRACTION OF HA WHICH IS PHYSICAL HEIGHT                              ARE0860
C***PHT- PHYSICAL STACK HEIGHT(M)                                            ARE0870
C***(HA-PHT) IS PLUME RISE                                                   ARE0880
      PHT=FH*HA                                                              ARE0890
      THT=PHT                                                                ARE0900
      IF (PHT.LT.1.) THT=1.                                                  ARE0910
      UPL=U*(THT/10.)**PL(KST)                                               ARE0920
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      IF (UPL.LT.1.) UPL=1.                                              ARE0930
      HA=((HA-PHT)*5.)/UPL+PHT                                           ARE0940
C***DETERMINE HEIGHT CLASS                                               ARE0950
      IH=NHTS                                                            ARE0960
      GO TO (70,50,40), NHTS                                             ARE0970
40    IF (HA.LT.BPHM(2)) IH=2                                            ARE0980
50    IF (HA.LT.BPHM(1)) IH=1                                            ARE0990
      GO TO 70                                                           ARE1000
C***SINCE SOURCE NO. IS ZERO, CALCULATE COORDINATES OF SOURCE CENTER      ARE1010
C***AND DEPENDING ON WIND DIRECTION BRANCH TO CODE WHICH DETERMINES       ARE1020
C***THE NEXT AREA SOURCE IN THE UPWIND DIRECTION.                        ARE1030
60    D=.5                                                               ARE1040
      RC=FLOAT(IR)+RMINI+D                                               ARE1050
      SC=FLOAT(IS)+SMINI+D                                               ARE1060
C***IWD IS 1 FOR THETA LESS THAN 90 DEG., 2 FOR 90-180  DEG, ETC.        ARE1070
70    GO TO (80,90,110,120), IWD                                         ARE1080
C***IWD=1******                                                          ARE1090
C***DETERMINE TWO UPWIND BOUNDARIES(NORTH AND EAST).                     ARE1100
80    SB=SC+D                                                            ARE1110
      GO TO 100                                                          ARE1120
C***IWD=2******                                                          ARE1130
C***DETERMINE TWO UPWIND BOUNDARIES(SOUTH AND EAST).                     ARE1140
90    SB=SC-D                                                            ARE1150
100   RB=RC+D                                                            ARE1160
      GO TO 140                                                          ARE1170
C***IWD=3******                                                          ARE1180
C***DETERMINE TWO UPWIND BOUNDARIES(SOUTH AND WEST).                     ARE1190
110   SB=SC-D                                                            ARE1200
      GO TO 130                                                          ARE1210
C***IWD=4******                                                          ARE1220
C***DETERMINE TWO UPWIND BOUNDARIES(NORTH AND WEST).                     ARE1230
120   SB=SC+D                                                            ARE1240
130   RB=RC-D                                                            ARE1250
C***FIND LOCUS OF UPWIND RAY AND CLOSEST BORDER                          ARE1260
140   IF (SINT.EQ.0.) GO TO 160                                          ARE1270
C***IF SIN=0. NORTH OR SOUTH BOUNDARY IS APPROPRIATE.                    ARE1280
      XD1=(RB-RRE)/SINT                                                  ARE1290
C***XD1 IS DISTANCE(USER UNITS) TO EAST OR WEST BOUNDARY,                ARE1300
C***WHICHEVER IS UPWIND.                                                 ARE1310
      IF (COST.EQ.0.) GO TO 170                                          ARE1320
C***IF COS=0. EAST OR WEST BOUNDARY IS APPROPRIATE.                      ARE1330
      XD2=(SB-SRE)/COST                                                  ARE1340
C***XD2 IS DISTANCE(USER UNITS) TO NORTH  OR SOUTH BOUNDARY,             ARE1350
C***WHICHEVER IS UPWIND.                                                 ARE1360
      IF (XD1.LT.XD2) GO TO 170                                          ARE1370
150   RDUM=RRE+XD2*SINT+DELR                                             ARE1380
      SDUM=SB+DELS                                                       ARE1390
C***RDUM,SDUM ARE COORDINATES OF INTERSECTION WITH BOUNDARY PLUS         ARE1400
C***SMALL INCREMENTS TO STEP INSIDE NEXT UPWIND SOURCE.                  ARE1410
      DIST=XD2                                                           ARE1420
C***DIST IS DISTANCE TO NEAREST BORDER.                                  ARE1430
      GO TO 180                                                          ARE1440
160   XD2=(SB-SRE)/COST                                                  ARE1450
      GO TO 150                                                          ARE1460
170   RDUM=RB+DELR                                                       ARE1470
      SDUM=SRE+XD1*COST+DELS                                             ARE1480
      DIST=XD1                                                           ARE1490
180   DIST=DIST*CONTWO                                                   ARE1500
C***DIST IS IN KM.                                                       ARE1510
C***IF SOURCE NO. IS ZERO, PASS ON TO NEXT UPWIND AREA SOURCE            ARE1520
      IF (NS.EQ.0) GO TO 210                                             ARE1530
C***IF EMISSION RATE < 10E-10, POLLUTANT CONTRIBUTION WILL BE INSIGNIF-  ARE1540
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C***ICANT, GO ON TO NEXT UPWIND AREA SOURCE.                                    ARE1550
      IF (QA.LE.10.0E-10) GO TO 210                                             ARE1560
C***(A SUBSTANTIAL SAVINGS IN COMPUTATION TIME IS EFFECTED IF A LARGE           ARE1570
C***AREA WITH NO EMISSIONS IS DEFINED WITH A ZERO SOURCE STRENGTH               ARE1580
C***AS OPPOSED TO LEAVING THE AREA UNDEFINED ,THUS DEFAULTING TO THE            ARE1590
C***MINIMUM GRID SQUARE SIZE WHEN SEARCHING FOR THE NEXT UPWIND SOURCE.)        ARE1600
C***USE THIS SOURCE TO RECEPTOR DISTANCE AND HEIGHT CLASS TO GET A VALUE        ARE1610
C***FOR  INTEGRATED XU/Q TO THIS DISTANCE BY INTERPOLATING IN TABLE OF          ARE1620
C***PRECALCULATED CHI*U/Q VALUES. SUBROUTINE JMHPOL PERFORMS THE                ARE1630
C***INTERPOLATION.                                                              ARE1640
      CALL JMHPOL (DIST,IH,CONC,NS,K,XLIM)                                      ARE1650
C***XL(KM) IS THE UPWIND DISTANCE TO THE LAST INTERSECTION WITH A               ARE1660
C***BOUNDARY POINT.                                                             ARE1670
      IF (XL.LE.0) GO TO 190                                                    ARE1680
      IF (IH.NE.IHL) CALL JMHPOL (XL,IH,CONCL,NS,K,XLIM)                        ARE1690
190   DIFF=CONC-CONCL                                                           ARE1700
C***THE CHI*U/Q  DIFFERENCE IS MULTIPLIED BY EMISSION RATE  AND DIVIDED         ARE1710
C***BY WIND SPEED WHICH HAS BEEN MODIFIED BY THE POWER LAW TO THE PROPER        ARE1720
C***HEIGHT.  THIS CALCULATED  VALUE, PROD, IS THE CONTRIBUTION OF SOURCE        ARE1730
C***NS TO THE TOTAL POLLUTANT CONCENTRATION AT THE K-TH RECEPTOR.               ARE1740
      PROD=QA*DIFF/UPL                                                          ARE1750
      ACHI(K)=ACHI(K)+PROD                                                      ARE1760
      AHCHI(K)=AHCHI(K)+PROD                                                    ARE1770
      KSIG=IASIGS(NS)                                                           ARE1780
      IF (KSIG.EQ.0) GO TO 200                                                  ARE1790
C***IF THE SOURCE IS SIGNIFICANT, STORE PARTIAL CONCENTRATION                   ARE1800
      ASIGS(K,KSIG)=ASIGS(K,KSIG)+PROD                                          ARE1810
      AHSIGS(K,KSIG)=AHSIGS(K,KSIG)+PROD                                        ARE1820
      ASIGS(K,11)=ASIGS(K,11)+PROD                                              ARE1830
      AHSIGS(K,11)=AHSIGS(K,11)+PROD                                            ARE1840
200   CONCL=CONC                                                                ARE1850
C***SAVE PARTIAL CONCENTRATION FOR ALL SOURCES                                  ARE1860
      PARTC(NS)=PROD                                                            ARE1870
      IHL=IH                                                                    ARE1880
      GO TO 220                                                                 ARE1890
210   IHL=0                                                                     ARE1900
220   XL=DIST                                                                   ARE1910
C***IS THIS POINT OUTSIDE SOURCE REGION?                                        ARE1920
      IF ((RDUM.LE.RMIN).OR.(RDUM.GE.RMAX)) GO TO 300                           ARE1930
      IF ((SDUM.LE.SMIN).OR.(SDUM.GE.SMAX)) GO TO 300                           ARE1940
C***IR,IS IA INDICES FOR NEXT SOURCE                                            ARE1950
      IR=RDUM-RMINI                                                             ARE1960
      IS=SDUM-SMINI                                                             ARE1970
      GO TO 30                                                                  ARE1980
C***                                                                            ARE1990
C***RECEPTOR IS OUTSIDE LIMITS OF GRID***                                       ARE2000
C***                                                                            ARE2010
230   DXMIN=99999.                                                              ARE2020
C***FIND THE INTERSECTION OF THE UPWIND AZIMUTH FROM THE RECEPTOR TO            ARE2030
C***THE NEAREST BORDER OF THE AREA SOURCE REGION.                               ARE2040
      ICNT=0                                                                    ARE2050
      RM=RMIN                                                                   ARE2060
C*** FIND LOCUS FOR RMIN, THEN RMAX                                             ARE2070
      DO 260 L=1,2                                                              ARE2080
      RMR=RM-RRE                                                                ARE2090
C*** IF SINT IS ZERO, THERE IS NO LOCUS WITH THIS BOUNDARY.                     ARE2100
      IF (SINT.EQ.0.) GO TO 250                                                 ARE2110
C***FIND NORTH COORDINATE OF LOCUS.                                             ARE2120
      S=RMR*COST/SINT+SRE                                                       ARE2130
      IF (S.GT.SMAX) GO TO 250                                                  ARE2140
      IF (S.LT.SMIN) GO TO 250                                                  ARE2150
C***FIND DISTANCE FROM RECEPTOR TO LOCUS.                                       ARE2160
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      DX=RMR*SINT+(S-SRE)*COST                                          ARE2170
C***IF DISTANCE IS NEGATIVE, THIS IS A DOWNWIND LOCUS, NOT UPWIND.      ARE2180
      IF (DX) 250,240,240                                               ARE2190
C***IS THIS DISTANCE SHORTER THAN A PREVIOUS LOCUS?                     ARE2200
240   IF (DX.GE.DXMIN) GO TO 250                                        ARE2210
      RLOC=RM                                                           ARE2220
      SLOC=S                                                            ARE2230
      DXMIN=DX                                                          ARE2240
C***COUNT THE NUMBER OF LOCI FOUND.                                     ARE2250
      ICNT=ICNT+1                                                       ARE2260
250   RM=RMAX                                                           ARE2270
260   CONTINUE                                                          ARE2280
      SM=SMIN                                                           ARE2290
C***FIND LOCUS FOR SMIN, THEN SMAX.                                     ARE2300
      DO 290 L=3,4                                                      ARE2310
      SMS=SM-SRE                                                        ARE2320
C***IF COSINE IS ZERO, THERE IS NO LOCUS WITH THIS BOUNDARY.            ARE2330
      IF (COST.EQ.0.) GO TO 280                                         ARE2340
C***FIND EAST COORDINATE OF LOCUS.                                      ARE2350
      R=SMS*SINT/COST+RRE                                               ARE2360
      IF (R.GT.RMAX) GO TO 280                                          ARE2370
      IF (R.LT.RMIN) GO TO 280                                          ARE2380
C***FIND DISTANCE FROM RECEPTOR TO LOCUS.                               ARE2390
      DX=(R-RRE)*SINT+SMS*COST                                          ARE2400
C***IF DISTANCE IS NEGATIVE, THIS IS A DOWNWIND LOCUS, NOT UPWIND.      ARE2410
      IF (DX) 280,270,270                                               ARE2420
C***IS THIS DISTANCE SHORTER THAN A PREVIOUS LOCUS?                     ARE2430
270   IF (DX.GE.DXMIN) GO TO 280                                        ARE2440
      RLOC=R                                                            ARE2450
      SLOC=SM                                                           ARE2460
      DXMIN=DX                                                          ARE2470
      ICNT=ICNT+1                                                       ARE2480
280   SM=SMAX                                                           ARE2490
290   CONTINUE                                                          ARE2500
C***IF ICNT=0 NO LOCI WERE FOUND, THEREFORE NO AREA SOURCE CONTRIBUTION ARE2510
C***AT THIS RECEPTOR.                                                   ARE2520
      IF (ICNT.EQ.0) GO TO 300                                          ARE2530
      DIST=DXMIN                                                        ARE2540
C***FIND THE DISTANCE TO THE NEAREST SOURCE IN KM                       ARE2550
C***FIND CO-ORDINATES TO LOCATE SOURCE                                  ARE2560
C***DIST IS IN INTERNAL UNITS.                                          ARE2570
      XL=DIST*CONTWO                                                    ARE2580
C***XL IS IN KM.                                                        ARE2590
C***IR AND IS NOW ARE COORDINATES OF A POINT LYING IN THE NEXT UPWIND   ARE2600
C***AREA SOURCE.                                                        ARE2610
      IR=RLOC+DELR-RMINI                                                ARE2620
      IS=SLOC+DELS-SMINI                                                ARE2630
      GO TO 30                                                          ARE2640
C***WRITE PARTIAL CONCENTRATIONS TO DISK                                ARE2650
300   IF (IOPT(8).EQ.0) GO TO 310                                       ARE2660
      WRITE (NIP) IDATE,LH,K,(PARTC(J),J=1,NAS)                         ARE2670
310   CONTINUE                                                          ARE2680
      RETURN                                                            ARE2690
C                                                                       ARE2700
      END                                                               ARE2710



      SUBROUTINE JMHPTU (HSAV,DSAV,Z,TLOS,LH)                           PTU0010
C      THE PURPOSE OF THIS ROUTINE IS TO CALCULATE CONCENTRATIONS FROM  PTU0020
C      POINT SOURCES.                                                   PTU0030
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C       INPUT VARIABLES ARE...                                                  PTU0040
C          HSAV- AN ARRAY OF EFFECTIVE HEIGHTS FOR POINT SOURCES(METERS)        PTU0050
C          DSAV-AN ARRAY OF DISTANCES TO FINAL RISE(KM)                         PTU0060
C          Z- RECEPTOR HEIGHT.                                                  PTU0070
C          TLOS- PARTIAL COMPUTATION RELATED TO POLLUTANT LOSS.                 PTU0080
C          IDATE- YEAR AND JULIAN DAY(IN COMMON/METDAT/)                        PTU0090
C          LH- HOUR                                                             PTU0100
       COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR PTU0110
      1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S PTU0120
      2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)  PTU0130
       COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA PTU0140
      1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR PTU0150
      2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)  PTU0160
       COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE PTU0170
      1(2)                                                                  PTU0180
       COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                      PTU0190
       DIMENSION HSAV(NPT), DSAV(250), UPH(250), HPR(250), FP(250)          PTU0200
C***                                                                        PTU0210
C***                                                                        PTU0220
C***ZERO EFFECTIVE STACK HEIGHT FOR EACH SOURCE                             PTU0230
C***                                                                        PTU0240
      DO 10 J=1,NPT                                                         PTU0250
10    HSAV(J)=0.0                                                           PTU0260
C***LOOP ON RECEPTORS***                                                    PTU0270
      DO 120 K=1,NRECEP                                                     PTU0280
C***                                                                        PTU0290
C***CALCULATE CONCENTRATIONS FROM POINT SOURCES***                          PTU0300
C***     LOOP ON POINT SOURCES                                              PTU0310
C***                                                                        PTU0320
      DO 110 J=1,NPT                                                        PTU0330
      PARTC(J)=0.0                                                          PTU0340
      RQ=SOURCE(1,J)                                                        PTU0350
      SQ=SOURCE(2,J)                                                        PTU0360
C***DETERMINE UPWIND DISTANCE                                               PTU0370
C***XDUM,YDUM IN INTERNAL UNITS. X,Y IN KM.                                 PTU0380
      XDUM=RQ-RREC(K)                                                       PTU0390
      YDUM=SQ-SREC(K)                                                       PTU0400
      X=(YDUM*COST+XDUM*SINT)*CONTWO                                        PTU0410
C*** X IS THE UPWIND DISTANCE  OF THE SOURCE FROM THE RECEPTOR.             PTU0420
C***IF X IS NEGATIVE, INDICATING THAT THE SOURCE IS DOWNWIND OF             PTU0430
C***THE RECEPTOR, THE CALCULATION IS TERMINATED ASSUMING NO                 PTU0440
C***CONTRIBUTION FROM THAT SOURCE.                                          PTU0450
      IF (X.LE.0.0) GO TO 110                                               PTU0460
C***                                                                        PTU0470
C***DETERMINE CROSSWIND DISTANCE                                            PTU0480
C***                                                                        PTU0490
      Y=(YDUM*SINT-XDUM*COST)*CONTWO                                        PTU0500
      HF=HSAV(J)                                                            PTU0510
C***SKIP PLUME RISE CALCULATION IF EFFECTIVE HEIGHT HAS ALREADY BEEN        PTU0520
C***    CALCULATED FOR THIS SOURCE                                          PTU0530
      IF (HF.GT.0.0) GO TO 80                                               PTU0540
C*** MODIFY WIND SPEED BY POWER LAW PROFILE IN ORDER TO TAKE INTO            PTU0550
C***ACCOUNT THE INCREASE OF WIND SPEED WITH HEIGHT.                         PTU0560
C***ASSUME WIND MEASUREMENTS ARE REPRESENTATIVE FOR A 10 METER HEIGHT.      PTU0570
      THT=SOURCE(5,J)                                                       PTU0580
C***POINT SOURCE HEIGHT NOT ALLOWED TO BE LESS THAN 1 METER.                PTU0590
      IF (THT.LT.1.) THT=1.                                                 PTU0600
      UPL=U*(THT/10.)**PL(KST)                                              PTU0610
C***WIND SPEED NOT ALLOWED TO BE LESS THAN 1 METER/SEC.                     PTU0620
      IF (UPL.LT.1.) UPL=1.                                                 PTU0630
      UPH(J)=UPL                                                            PTU0640
      VS=SOURCE(8,J)                                                        PTU0650
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      BUOY=SOURCE(9,J)                                                  PTU0660
      TS=SOURCE(6,J)                                                    PTU0670
      DELT=TS-TEMP                                                      PTU0680
      F=BUOY*DELT/TS                                                    PTU0690
C***  IOPT(13) HOURLY EMISSION INPUT FROM TAPE/DISK?  0=NO, 1=YES.      PTU0700
      IF (IOPT(13).EQ.0) GO TO 20                                       PTU0710
C***MODIFY EXIT VELOCITY AND BUOYANCY BY RATIO OF HOURLY EMISSIONS      PTU0720
C***TO AVERAGE EMISSIONS                                                PTU0730
      SCALE=SOURCE(IPOL,J)/PSAV(J)                                      PTU0740
      VS=VS*SCALE                                                       PTU0750
      F=F*SCALE                                                         PTU0760
20    D=SOURCE(7,J)                                                     PTU0770
C***CALCULATE  H PRIME WHICH TAKES INTO ACCOUNT STACK DOWNWASH          PTU0780
C***BRIGGS(1973) PAGE 4                                                 PTU0790
      HPRM=THT                                                          PTU0800
      DUM=VS/UPL                                                        PTU0810
      IF (DUM.LT.1.5) HPRM=THT+2.*D*(DUM-1.5)                           PTU0820
      IF (HPRM.LT.0.) HPRM=0.                                           PTU0830
C***                                                                    PTU0840
C***CALCULATE PLUME RISE AND ADD H PRIME TO OBTAIN EFFECTIVE            PTU0850
C***STACK HEIGHT.                                                       PTU0860
C***                                                                    PTU0870
C***PLUME RISE CALCULATION                                              PTU0880
      IF (KST.GT.4) GO TO 40                                            PTU0890
C***PLUME RISE FOR UNSTABLE CONDITIONS                                  PTU0900
      IF (TS.LT.TEMP) GO TO 50                                          PTU0910
      IF (F.GE.55.) GO TO 30                                            PTU0920
C***DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F<55)             PTU0930
C***FOUND BY EQUATING BRIGGS(1969) EQ 5.2, PAGE 59 WITH COMBINATION OF  PTU0940
C***BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.                 PTU0950
      DTMB=0.0297*TS*VS**0.33333/D**0.66667                             PTU0960
      IF (DELT.LT.DTMB) GO TO 50                                        PTU0970
C***DISTANCE OF FINAL BUOYANT RISE(0.049 IS 14*3.5/1000)                PTU0980
C***BRIGGS(1971) EQUATION 7,F<55, AND DIST TO FINAL RISE IS 3.5 XSTAR   PTU0990
      DISTF=0.049*F**0.625                                              PTU1000
C***COMBINATION OF BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.  PTU1010
      HF=HPRM+21.425*F**0.75/UPL                                        PTU1020
      GO TO 70                                                          PTU1030
C***DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F>55)             PTU1040
C***FOUND BY EQUATING BRIGGS(1969) EQ 5.2, PAGE 59 WITH COMBINATION OF  PTU1050
C***  BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.               PTU1060
30    DTMB=0.00575*TS*VS**0.66667/D**0.33333                            PTU1070
      IF (DELT.LT.DTMB) GO TO 50                                        PTU1080
C***DISTANCE OF FINAL BUOYANT RISE (0.119 IS 34*3.5/1000)               PTU1090
C***BRIGGS(1971) EQUATION 7, F>55, AND DIST TO FINAL RISE IS 3.5 XSTAR. PTU1100
      DISTF=0.119*F**0.4                                                PTU1110
C***COMBINATION OF BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.  PTU1120
      HF=HPRM+38.71*F**0.6/UPL                                          PTU1130
      GO TO 70                                                          PTU1140
C***PLUME RISE FOR STABLE CONDITIONS.                                   PTU1150
40    DTHDZ=0.02                                                        PTU1160
      IF (KST.GT.5) DTHDZ=0.035                                         PTU1170
      S=9.80616*DTHDZ/TEMP                                              PTU1180
      IF (TS.LT.TEMP) GO TO 60                                          PTU1190
C***DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(STABLE)           PTU1200
C***FOUND BY EQUATING BRIGGS(1975) EQ 59, PAGE 96 FOR STABLE BUOYANCY   PTU1210
C***RISE WITH BRIGGS(1969) EQ 4.28, PAGE 59 FOR STABLE MOMENTUM RISE.   PTU1220
      DTMB=0.019582*TEMP*VS*SQRT(S)                                     PTU1230
      IF (DELT.LT.DTMB) GO TO 60                                        PTU1240
C***STABLE BUOYANT RISE FOR WIND CONDITIONS.(WIND NOT ALLOWED LOW       PTU1250
C***ENOUGH IN RAM TO REQUIRE STABLE RISE IN CALM CONDITIONS.)           PTU1260
C***BRIGGS(1975) EQ 59, PAGE 96.                                        PTU1270
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      HF=HPRM+2.6*(F/(UPL*S))**0.333333                                  PTU1280
C***COMBINATION OF BRIGGS(1975) EQ 48 AND EQ 59. NOTE DISTF IN KM.       PTU1290
      DISTF=0.0020715*UPL/SQRT(S)                                        PTU1300
      GO TO 70                                                           PTU1310
C***UNSTABLE-NEUTRAL MOMENTUM RISE                                       PTU1320
C***BRIGGS(1969) EQUATION 5.2, PAGE 59 NOTE: MOST ACCURATE WHEN VS/U>4;  PTU1330
C***TENDS TO OVERESTIMATE RISE WHEN VS/U<4 (SEE BRIGGS(1975) PAGE 78,    PTU1340
C***  FIGURE 4.)                                                         PTU1350
50    HF=HPRM+3.*VS*D/UPL                                                PTU1360
      DISTF=0.                                                           PTU1370
      GO TO 70                                                           PTU1380
C***STABLE MOMENTUM RISE                                                 PTU1390
60    DHA=3.*VS*D/UPL                                                    PTU1400
C***BRIGGS(1969) EQUATION 4.28, PAGE 59                                  PTU1410
      DELHF=1.5*(VS*VS*D*D*TEMP/(4.*TS*UPL))**0.333333/S**0.166667       PTU1420
      IF (DHA.LT.DELHF) DELHF=DHA                                        PTU1430
      HF=HPRM+DELHF                                                      PTU1440
      DISTF=0.                                                           PTU1450
C***STORE OFF PLUME HEIGHT(ETC.) FOR THIS SOURCE FOR USE WITH            PTU1460
C***OTHER RECEPTORS.                                                     PTU1470
70    HSAV(J)=HF                                                         PTU1480
      DSAV(J)=DISTF                                                      PTU1490
      UPH(J)=UPL                                                         PTU1500
      HPR(J)=HPRM                                                        PTU1510
      FP(J)=F                                                            PTU1520
C***IF SOURCE-RECEPTOR DISTANCE IS GREATER OR EQUAL TO DISTANCE TO FINAL PTU1530
C***SKIP PLUME RISE CALCULATION AND USE FINAL RISE.                      PTU1540
80    IF (X.GE.DSAV(J)) GO TO 90                                         PTU1550
C***PLUME RISE FOR DISTANCE X(160 IS 1.6*1000**.67 BECAUSE X IN KM)      PTU1560
      HX=HPR(J)+160.*FP(J)**0.333333*X**0.666667/UPH(J)                  PTU1570
      IF (HX.LT.HF) HF=HX                                                PTU1580
C***SUBROUTINE DBTRCU RETURNS THE DISPERSION PARAMTERS,SY AND SZ(METERS) PTU1590
C***AND RELATIVE CONCENTRATION VALUE CHI/Q (SEC/M**3)                    PTU1600
90    UPL=UPH(J)                                                         PTU1610
      CALL DBTRCU (UPL,Z,HF,HL,X,Y,KST,SY,SZ,PROD)                       PTU1620
C***CALCULATE TRAVEL TIME IN KM-SEC/M TO INCLUDE DECAY RATE OF POLLUTANT PTU1630
      TT=X/UPL                                                           PTU1640
C***TLOS IN METERS/KM-SEC, SO TT*TLOS IS DIMENSIONLESS                   PTU1650
      PROD=PROD*SOURCE(IPOL,J)/EXP(TT*TLOS)                              PTU1660
C***INCREMENT CONCENTRATION AT K-TH RECEPTOR(G/M**3)                     PTU1670
      PCHI(K)=PCHI(K)+PROD                                               PTU1680
      PHCHI(K)=PHCHI(K)+PROD                                             PTU1690
      KSIG=IPSIGS(J)                                                     PTU1700
      IF (KSIG.EQ.0) GO TO 100                                           PTU1710
C***STORE CONCENTRATIONS FROM SIGNIFICANT SOURCES.(G/M**3)               PTU1720
      PSIGS(K,KSIG)=PSIGS(K,KSIG)+PROD                                   PTU1730
      PHSIGS(K,KSIG)=PHSIGS(K,KSIG)+PROD                                 PTU1740
      PSIGS(K,26)=PSIGS(K,26)+PROD                                       PTU1750
      PHSIGS(K,26)=PHSIGS(K,26)+PROD                                     PTU1760
100   PARTC(J)=PROD                                                      PTU1770
110   CONTINUE                                                           PTU1780
C***END OF LOOP FOR SOURCES                                              PTU1790
C***WRITE PARTIAL CONCENTRATIONS ON DISK(G/M**3)                         PTU1800
      IF (IOPT(8).EQ.0) GO TO 120                                        PTU1810
C***USER PLEASE NOTE: PARTIAL CONC. IN G/M**3, NOT MICROGRAM/M**3        PTU1820
      WRITE (NIP) IDATE,LH,K,(PARTC(J),J=1,NPT)                          PTU1830
120   CONTINUE                                                           PTU1840
C***END OF LOOP FOR RECEPTORS                                            PTU1850
      RETURN                                                             PTU1860
C                                                                        PTU1870
      END                                                                PTU1880
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      SUBROUTINE JMN540 (NHTS,Z,XLIM,TLOS)                                  54U0010
C***THE PURPOSE OF THIS ROUTINE IS TO CALCULATE TABLES OF                    54U0020
C***CONCENTRATION NORMALIZED FOR WIND SPEED AND EMISSION RATE                54U0030
C***FROM AREA SOURCES (CHI*U/Q). SUBROUTINE JMHCZU IS CALLED FOR             54U0040
C***INTEGRATION OF RELATIVE CONCENTRATION.                                   54U0050
C     INPUT VARIABLES ARE...                                                 54U0060
C         HINT- REPRESENTATIVE HEIGHTS FOR AREA SOURCES                      54U0070
C         NHTS- NUMBER OF HEIGHT CLASSES                                     54U0080
C         Z- RECEPTOR HEIGHT(M)                                              54U0090
C         XLIM- DISTANCE LIMIT ON INTEGRATION OF AREA SOURCES(KM)            54U0100
C         TLOS- PARTIAL COMPUTATION RELATED TO POLLUTANT LOSS                54U0110
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA     54U0120
     1SIGS(100),IPSIGS(250),THETA,U,KST,EL,TEMP,SINT,COST,BPH(2),IWD,PAR     54U0130
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)      54U0140
      COMMON /HEIGHT/ HINT(3),HARE(3),BPHH(2),EH                             54U0150
      COMMON /RELC/ CIN(3,200)                                               54U0160
C***CONCENTRATION TABLES ARE GENERATED FOR UP TO 3 HEIGHTS.                  54U0170
      DO 190 IH=1,NHTS                                                       54U0180
      H=HINT(IH)                                                             54U0190
      HARE(IH)=H                                                             54U0200
      IF (EH.EQ.1.) GO TO 10                                                 54U0210
      PHT=EH*H                                                               54U0220
      UPL=U*(PHT/10.)**PL(KST)                                               54U0230
      IF (UPL.LT.1.) UPL=1.                                                  54U0240
      H=((H-PHT)*5.)/UPL+PHT                                                 54U0250
      HARE(IH)=H                                                             54U0260
      GO TO 20                                                               54U0270
C***MODIFY WIND SPEED BY POWER LAW PROFILE.                                  54U0280
10    IF (H.LT.1.0) H=1.0                                                    54U0290
      UPL=U*(H/10.)**PL(KST)                                                 54U0300
      IF (UPL.LT.1.0) UPL=1.0                                                54U0310
C***ZERO CONCENTRATION ARRAY                                                 54U0320
20    DO 30 J=1,200                                                          54U0330
30    CIN(IH,J)=0.0                                                          54U0340
      N=0                                                                    54U0350
      NC=10                                                                  54U0360
      CP=0.0                                                                 54U0370
      CI=0.0                                                                 54U0380
      JD=1                                                                   54U0390
C***DISTANCE IN KM.                                                          54U0400
      X=0.0                                                                  54U0410
      DELX=0.001                                                             54U0420
      ID=1                                                                   54U0430
40    CL=CP                                                                  54U0440
      X=X+DELX                                                               54U0450
C***SUBROUTINE JMHCZU DETERMINES THE RELATIVE CONCENTRATION AT               54U0460
C***VARYING DOWNWIND DISTANCES.                                              54U0470
      CALL JMHCZU (Z,H,X,SZ,CP)                                              54U0480
C***CALCULATE TRAVEL TIME IN KM-SEC/M.                                       54U0490
      TT=X/UPL                                                               54U0500
C***ADJUST RELATIVE CONCENTRATION BY POLLUTANT DECAY RATE.                   54U0510
C***TLOS IN METERS/KM-SEC, SO TT*TLOS IS DIMENSIONLESS.                      54U0520
      CP=CP/EXP(TT*TLOS)                                                     54U0530
C***INTEGRATED RELATIVE CONCENTRATION IS DIMENSIONLESS.                      54U0540
C***MULTIPLICATION BY 500. CONVERTS TO METERS AND DIVIDES BY 2.              54U0550
      CI=500.*DELX*(CL+CP)+CI                                                54U0560
      GO TO (50,90,120,150,180), JD                                          54U0570
C***NORMALIZED CONCENTRATIONS ARE STORED IN TABLES FOR VARYING               54U0580
C***DISTANCES AT VARYING TIME INTERVALS. THE FOLLOWING COMMENTS DETAIL       54U0590
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C***THE TABLE'S CONSTRUCTION.                                                    54U0600
C***DISTANCE<100M; CALCULATE EVERY 1 M,  STORE EVERY 10 M, 0.01KM.               54U0610
50    IF (X-0.0993) 60,80,80                                                     54U0620
60    N=N+1                                                                      54U0630
      IF (N.LT.NC) GO TO 40                                                      54U0640
      N=0                                                                        54U0650
70    ID=(100.*X)+0.0008                                                         54U0660
C***STORAGE LOCATIONS 1-9 CONTAIN INTEGRATIONS FOR 10-90 M.                      54U0670
      CIN(IH,ID)=CI                                                              54U0680
      GO TO 40                                                                   54U0690
C***DISTANCE 100-500M: CHANGE DELX TO 10M; STORE EVERY 10 M, 0.01KM.             54U0700
80    JD=2                                                                       54U0710
      DELX=0.01                                                                  54U0720
      GO TO 70                                                                   54U0730
C***STORAGE LOCATIONS 10-49 CONTAIN INTEGRATIONS FOR 100 M TO 490 M.             54U0740
90    IF (X-0.497) 70,100,100                                                    54U0750
C*** DISTANCE 500 -3000M.; CHANGE DELX TO 100 M; STORE EVERY 100 M, 0.1KM        54U0760
100   JD=3                                                                       54U0770
      DELX=0.1                                                                   54U0780
110   ID=(10.*X)+45.08                                                           54U0790
C***STORAGE LOCATIONS 50-74 CONTAIN INTEGRATIONS FOR 500 M TO 2900 M.            54U0800
      CIN(IH,ID)=CI                                                              54U0810
      GO TO 40                                                                   54U0820
120   IF (X-2.95) 110,130,130                                                    54U0830
C*** DISTANCE 3000- 15,000M. ; CHANGE DELX TO 500 M; STORE EVERY 500 M,          54U0840
C*** 0.5KM.                                                                      54U0850
130   JD=4                                                                       54U0860
      DELX=.5                                                                    54U0870
140   ID=(2.*X)+69.08                                                            54U0880
C***STORAGE LOCATIONS 75-98 CONTAIN INTEGRATIONS FOR 3000 M TO 14.5 KM.          54U0890
      CIN(IH,ID)=CI                                                              54U0900
      GO TO 40                                                                   54U0910
150   IF (X-14.95) 140,160,160                                                   54U0920
C*** DISTANCE >15,000M.; CHANGE DELX TO 1000M; STORE EVERY 1000 M, 1KM.          54U0930
160   JD=5                                                                       54U0940
      DELX=1.                                                                    54U0950
170   ID=X+84.08                                                                 54U0960
C***STORAGE LOCATIONS 99-200 CONTAIN INTEGRATIONS FOR 15 KM TO A                 54U0970
C***MAXIMUM OF 116 KM.                                                           54U0980
      CIN(IH,ID)=CI                                                              54U0990
      GO TO 40                                                                   54U1000
180   IF (X-XLIM) 170,190,190                                                    54U1010
190   CONTINUE                                                                   54U1020
      RETURN                                                                     54U1030
C                                                                                54U1040
      END                                                                        54U1050
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      SUBROUTINE JMHCZU (Z,H,X,SZ,RCZ)                                           CZU0010
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA         CZU0020
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR         CZU0030
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)          CZU0040
C        SUBROUTINE JMHCZU CALCULATES CHI*U/Q, RELATIVE CONCENTRATION            CZU0050
C         NORMALIZED FOR WIND SPEED AND EMISSION RATE, FOR A CROSSWIND           CZU0060
C         INFINTE SOURCE UPWIND OF A RECEPTOR (IN UNITS OF: PER METER            CZU0070
C        JMHCZU CALLS SUBROUTINE BRSZ                                            CZU0080
C        THE INPUT VARIABLES ARE....                                             CZU0090
C         Z    RECEPTOR HEIGHT (M)                                              CZU0100
C         H    EFFECTIVE STACK HEIGHT (M)                                       CZU0110
C         HL   MIXING HEIGHT- TOP OF NEUTRAL OR UNSTABLE LAYER(M)               CZU0120
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C                (THROUGH COMMON/METCON/)                                    CZU0130
C             X    DISTANCE  SOURCE IS UPWIND OF RECEPTOR (KM)               CZU0140
C             KST  STABILITY CLASS (THROUGH COMMON /METCON/)                 CZU0150
C            THE OUTPUT VARIABLES ARE....                                    CZU0160
C            SZ    VERTICAL DISPERSION PARAMTER.                             CZU0170
C            RCZ   RELATIVE CONCENTRATION HAS UNITS OF: PER METER.           CZU0180
C         THE FOLLOWING EQUATION IS SOLVED --                                CZU0190
C            RC = (1/2.5066 *SIGMA Z) * ((EXP(-.05*((Z-H)/SIGMA Z)**2)       CZU0200
C                 + (EXP(-0.5*((Z+H)/SIGMA Z)**2))                          CZU0210
C                 PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (N=1,K) --  CZU0220
C                   FOR NEUTRAL OR UNSTABLE CASES:                          CZU0230
C                  TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)                 CZU0240
C                  TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)                 CZU0250
C                  TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)                 CZU0260
C                  TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)                 CZU0270
C            2.5066 IS THE SQUARE ROOT OF 2 * PI                            CZU0280
C***NOTE THAT MIXING HEIGHT- THE TOP OF THE NEUTRAL OR UNSTABLE LAYER-       CZU0290
C***HAS A VALUE ONLY FOR STABILITIES 1-4, THAT IS, MIXING HEIGHT             CZU0300
C***DOES NOT EXIST FOR STABLE LAYERS AT THE GROUND SURFACE- STABILITY         CZU0310
C***5 OR 6.                                                                  CZU0320
C            STATEMENTS 190 TO 330 CALCULATE RC, THE RELATIVE CONCENTRATION, CZU0330
C             USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE      CZU0340
C             VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.            CZU0350
C             CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE            CZU0360
C             EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN    CZU0370
C             -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS    CZU0380
C             PRINTED INFORMING OF THIS.                                     CZU0390
C            CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.      CZU0400
C            IWRI IS CONTROL CODE FOR OUTPUT                                 CZU0410
      IWRI=6                                                                 CZU0420
C***IF STABLE, SKIP CONSIDERATION OF MIXING HEIGHT.                          CZU0430
      IF (KST.GE.5) GO TO 40                                                 CZU0440
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0., AND RETURN.            CZU0450
      IF (H-HL) 10,10,20                                                     CZU0460
10    IF (Z-HL) 40,40,180                                                    CZU0470
20    IF (Z-HL) 180,30,30                                                    CZU0480
30    WRITE (IWRI,430)                                                       CZU0490
      RETURN                                                                 CZU0500
C        IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS       CZU0510
C         PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                      CZU0520
40    IF (X-0.001) 180,50,50                                                 CZU0530
50    CALL BRSZ (X,KST,SZ)                                                   CZU0540
C        SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE        CZU0550
C        Z-DIRECTION (M)                                                     CZU0560
      IF (KST-4) 60,60,70                                                    CZU0570
60    IF (HL-5000.) 150,70,70                                                CZU0580
C        IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT:                     CZU0590
70    C2=2.*SZ*SZ                                                            CZU0600
      IF (Z) 180,80,100                                                      CZU0610
C***FOR Z = ZERO:                                                            CZU0620
80    C3=H*H/C2                                                              CZU0630
      IF (C3-50.) 90,180,180                                                 CZU0640
90    A2=2./EXP(C3)                                                          CZU0650
      RCZ=A2/(2.5066*SZ)                                                     CZU0660
      RETURN                                                                 CZU0670
C***FOR NOT-ZERO Z:                                                          CZU0680
100   A2=0.                                                                  CZU0690
      A3=0.                                                                  CZU0700
      CA=Z-H                                                                 CZU0710
      CB=Z+H                                                                 CZU0720
      C3=CA*CA/C2                                                            CZU0730
      C4=CB*CB/C2                                                            CZU0740
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      IF (C3-50.) 110,120,120                                                  CZU0750
110   A2=1./EXP(C3)                                                            CZU0760
120   IF (C4-50.) 130,140,140                                                  CZU0770
130   A3=1./EXP(C4)                                                            CZU0780
140   RCZ=(A2+A3)/(2.5066*SZ)                                                  CZU0790
      RETURN                                                                   CZU0800
C        IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,               CZU0810
C         THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH             CZU0820
C         HEIGHT REGARDLESS OF SOURCE HEIGHT.                                  CZU0830
150   IF (SZ/HL-1.6) 170,170,160                                               CZU0840
160   RCZ=1./HL                                                                CZU0850
      RETURN                                                                   CZU0860
C        INITIAL VALUE OF AN SET = 0.                                          CZU0870
C         AN   THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED             CZU0880
C          AND ADDED IN.                                                       CZU0890
170   AN=0.                                                                    CZU0900
      IF (Z) 180,340,190                                                       CZU0910
C***NOTE: AN ERRONEOUS NEGATIVE Z WILL RESULT IN ZERO CONCENTRATIONS.          CZU0920
180   RCZ=0.                                                                   CZU0930
      RETURN                                                                   CZU0940
C***CALCULATE MULTIPLE EDDY REFLECTIONS FOR ELEVATED RECEPTOR HEIGHT.          CZU0950
190   A1=1./(2.5066*SZ)                                                        CZU0960
      C2=2.*SZ*SZ                                                              CZU0970
      A2=0.                                                                    CZU0980
      A3=0.                                                                    CZU0990
      CA=Z-H                                                                   CZU1000
      CB=Z+H                                                                   CZU1010
      C3=CA*CA/C2                                                              CZU1020
      C4=CB*CB/C2                                                              CZU1030
      IF (C3-50.) 200,210,210                                                  CZU1040
200   A2=1./EXP(C3)                                                            CZU1050
210   IF (C4-50.) 220,230,230                                                  CZU1060
220   A3=1./EXP(C4)                                                            CZU1070
230   SUM=0.                                                                   CZU1080
      THL=2.*HL                                                                CZU1090
240   AN=AN+1.                                                                 CZU1100
      A4=0.                                                                    CZU1110
      A5=0.                                                                    CZU1120
      A6=0.                                                                    CZU1130
      A7=0.                                                                    CZU1140
      C5=AN*THL                                                                CZU1150
      CC=CA-C5                                                                 CZU1160
      CD=CB-C5                                                                 CZU1170
      CE=CA+C5                                                                 CZU1180
      CF=CB+C5                                                                 CZU1190
      C6=CC*CC/C2                                                              CZU1200
      C7=CD*CD/C2                                                              CZU1210
      C8=CE*CE/C2                                                              CZU1220
      C9=CF*CF/C2                                                              CZU1230
      IF (C6-50.) 250,260,260                                                  CZU1240
250   A4=1./EXP(C6)                                                            CZU1250
260   IF (C7-50.) 270,280,280                                                  CZU1260
270   A5=1./EXP(C7)                                                            CZU1270
280   IF (C8-50.) 290,300,300                                                  CZU1280
290   A6=1./EXP(C8)                                                            CZU1290
300   IF (C9-50.) 310,320,320                                                  CZU1300
310   A7=1./EXP(C9)                                                            CZU1310
320   T=A4+A5+A6+A7                                                            CZU1320
      SUM=SUM+T                                                                CZU1330
      IF (T-0.01) 330,240,240                                                  CZU1340
330   RCZ=A1*(A2+A3+SUM)                                                       CZU1350
      RETURN                                                                   CZU1360
```

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C CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR HEIGHT   CZU1370
340   A1=1./(2.5066*SZ)                                                  CZU1380
      A2=0.                                                              CZU1390
      C2=2.*SZ*SZ                                                        CZU1400
      C3=H*H/C2                                                          CZU1410
      IF (C3-50.) 350,360,360                                            CZU1420
350   A2=2./EXP(C3)                                                      CZU1430
360   SUM=0.                                                             CZU1440
      THL=2.*HL                                                          CZU1450
370   AN=AN+1.                                                           CZU1460
      A4=0.                                                              CZU1470
      A6=0.                                                              CZU1480
      C5=AN*THL                                                          CZU1490
      CC=H-C5                                                            CZU1500
      CE=H+C5                                                            CZU1510
      C6=CC*CC/C2                                                        CZU1520
      C8=CE*CE/C2                                                        CZU1530
      IF (C6-50.) 380,390,390                                            CZU1540
380   A4=2./EXP(C6)                                                      CZU1550
390   IF (C8-50.) 400,410,410                                            CZU1560
400   A6=2./EXP(C8)                                                      CZU1570
410   T=A4+A6                                                            CZU1580
      SUM=SUM+T                                                          CZU1590
      IF (T-0.01) 420,370,370                                            CZU1600
420   RCZ=A1*(A2+SUM)                                                    CZU1610
      RETURN                                                             CZU1620
C                                                                        CZU1630
430   FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABL CZU1640
     1E COMPUTATION CAN NOT BE MADE.')                                   CZU1650
C                                                                        CZU1660
      END                                                                CZU1670
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      SUBROUTINE DBTRCU (U,Z,H,HL,X,Y,KST,SY,SZ,RC)                      RCU0010
C      DETERMINE RELATIVE CONCENTRATION FROM POINT SOURCES.              RCU0020
C        SUBROUTINE DBTRCU CALCULATES CHI/Q CONCENTRATION VALUES; AND    RCU0030
C         CALLS UPON  BRSYSZ TO OBTAIN STANDARD DEVIATIONS.              RCU0040
C        THE INPUT VARIABLES ARE....                                     RCU0050
C         U     WIND SPEED (M/SEC)                                      RCU0060
C         Z     RECEPTOR HEIGHT (M)                                     RCU0070
C         H     EFFECTIVE STACK HEIGHT (M)                              RCU0080
C         HL    MIXING HEIGHT- TOP OF NEUTRAL OR UNSTABLE LAYER(M).     RCU0090
C         X     DISTANCE RECEPTOR IS DOWNWIND OF SOURCE (KM)            RCU0100
C         Y     DISTANCE RECEPTOR IS CROSSWIND FROM SOURCE (KM)         RCU0110
C         KST   STABILITY CLASS                                         RCU0120
C        THE OUTPUT VARIABLES ARE....                                    RCU0130
C          SY HORIZONTAL DISPERSION PARAMETER                            RCU0140
C          SZ VERTICAL DISPERSION PARAMETER                              RCU0150
C         RC   RELATIVE CONCENTRATION (SEC/M**3) ,CHI/Q                  RCU0160
C       IWRI IS CONTROL CODE FOR WARNING OUTPUT.                         RCU0170
      IWRI=6                                                             RCU0180
C        THE FOLLOWING EQUATION IS SOLVED --                             RCU0190
C          RC = (1/(2*PI*U*SIGMA Y*SIGMA Z))* (EXP(-0.5*(Y/SIGMA Y)**2)) RCU0200
C           (EXP(-0.5*((Z-H)/SIGMA Z)**2) + EXP(-0.5*((Z+H)/SIGMA Z)**2) RCU0210
C             PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (N=1,K) --   RCU0220
C                  FOR NEUTRAL OR UNSTABLE CASES:                        RCU0230
C              TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)                  RCU0240
C              TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)                  RCU0250
C              TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)                  RCU0260
C              TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)                  RCU0270
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C NOTE THAT MIXING HEIGHT- THE TOP OF THE NEUTRAL OR UNSTABLE LAYER-      RCU0280
C HAS A VALUE ONLY FOR STABILITIES 1-4, THAT IS, MIXING HEIGHT DOES       RCU0290
C NOT EXIST FOR STABLE LAYERS AT THE GROUND SURFACE- STABILITY 5 OR 6.    RCU0300
C         THE ABOVE EQUATION IS SIMILAR TO EQUATION (5.8) P 36 IN         RCU0310
C          WORKBOOK OF ATMOSPHERIC DISPERSION ESTIMATES WITH THE ADDITION RCU0320
C          OF THE EXPONENTIAL INVOLVING Y.                                RCU0330
C***IF STABLE, SKIP CONSIDERATION OF MIXING HEIGHT.                       RCU0340
      IF (KST.GE.5) GO TO 50                                              RCU0350
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0., AND RETURN.         RCU0360
      IF (H-HL) 10,10,20                                                  RCU0370
10    IF (Z-HL) 50,50,40                                                  RCU0380
20    IF (Z-HL) 40,30,30                                                  RCU0390
30    WRITE (IWRI,460)                                                    RCU0400
40    RC=0.                                                               RCU0410
      RETURN                                                              RCU0420
C        IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS    RCU0430
C         PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                   RCU0440
50    IF (X-0.001) 40,60,60                                               RCU0450
C        CALL BRSYSZ TO OBTAIN VALUES FOR SY AND SZ                       RCU0460
60    CALL BRSYSZ (X,KST,SY,SZ)                                           RCU0470
C         SY = SIGMA Y, THE STANDARD DEVIATION OF CONCENTRATION IN THE    RCU0480
C         Y-DIRECTION (M)                                                 RCU0490
C         SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE    RCU0500
C         Z-DIRECTION (M)                                                 RCU0510
      C1=1.                                                               RCU0520
      IF (Y) 70,90,70                                                     RCU0530
70    YD=1000.*Y                                                          RCU0540
C        YD IS CROSSWIND DISTANCE IN METERS.                              RCU0550
      DUM=YD/SY                                                           RCU0560
      TEMP=0.5*DUM*DUM                                                    RCU0570
      IF (TEMP-50.) 80,40,40                                              RCU0580
80    C1=EXP(TEMP)                                                        RCU0590
90    IF (KST-4) 100,100,110                                              RCU0600
100   IF (HL-5000.) 190,110,110                                           RCU0610
C        IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT,                  RCU0620
C         USE EQUATION 3.2 IF Z = 0, OR EQ 3.1 FOR NON-ZERO Z.            RCU0630
C         (EQUATION NUMBERS REFER TO WORKBOOK OF ATMOSPHERIC DISPERSION   RCU0640
C         ESTIMATES.)                                                     RCU0650
110   C2=2.*SZ*SZ                                                         RCU0660
      IF (Z) 40,120,140                                                   RCU0670
C       NOTE: AN ERRONEOUS NEGATIVE Z WILL RESULT IN ZERO CONCENTRATIONS  RCU0680
120   C3=H*H/C2                                                           RCU0690
      IF (C3-50.) 130,40,40                                               RCU0700
130   A2=1./EXP(C3)                                                       RCU0710
C        WADE EQUATION 3.2.                                               RCU0720
      RC=A2/(3.14159*U*SY*SZ*C1)                                          RCU0730
      RETURN                                                              RCU0740
140   A2=0.                                                               RCU0750
      A3=0.                                                               RCU0760
      CA=Z-H                                                              RCU0770
      CB=Z+H                                                              RCU0780
      C3=CA*CA/C2                                                         RCU0790
      C4=CB*CB/C2                                                         RCU0800
      IF (C3-50.) 150,160,160                                             RCU0810
150   A2=1./EXP(C3)                                                       RCU0820
160   IF (C4-50.) 170,180,180                                             RCU0830
170   A3=1./EXP(C4)                                                       RCU0840
C        WADE EQUATION 3.1.                                               RCU0850
180   RC=(A2+A3)/(6.28318*U*SY*SZ*C1)                                     RCU0860
      RETURN                                                              RCU0870
C        IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,          RCU0880
C         THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH        RCU0890
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C          HEIGHT REGARDLESS OF SOURCE HEIGHT BECAUSE OF REPEATED EDDY      RCU0900
C          REFLECTIONS FROM THE GROUND AND THE MIXING HEIGHT.               RCU0910
190   IF (SZ/HL-1.6) 210,210,200                                            RCU0920
C        WADE EQUATION 3.5.                                                 RCU0930
200   RC=1./(2.5066*U*SY*HL*C1)                                             RCU0940
      RETURN                                                                RCU0950
C        INITIAL VALUE OF AN SET = 0.                                       RCU0960
C          AN - THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED         RCU0970
C               AND ADDED IN.                                               RCU0980
210   AN=0.                                                                 RCU0990
      IF (Z) 40,370,220                                                     RCU1000
C      STATEMENTS 220-260 CALCULATE RC, THE RELATIVE CONCENTRATION,         RCU1010
C        USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE          RCU1020
C        VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.                RCU1030
C        CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE                RCU1040
C        EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN        RCU1050
C        -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS        RCU1060
C        PRINTED INFORMING OF THIS.                                         RCU1070
C      CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.           RCU1080
220   A1=1./(6.28318*U*SY*SZ*C1)                                            RCU1090
      C2=2.*SZ*SZ                                                           RCU1100
      A2=0.                                                                 RCU1110
      A3=0.                                                                 RCU1120
      CA=Z-H                                                                RCU1130
      CB=Z+H                                                                RCU1140
      C3=CA*CA/C2                                                           RCU1150
      C4=CB*CB/C2                                                           RCU1160
      IF (C3-50.) 230,240,240                                               RCU1170
230   A2=1./EXP(C3)                                                         RCU1180
240   IF (C4-50.) 250,260,260                                               RCU1190
250   A3=1./EXP(C4)                                                         RCU1200
260   SUM=0.                                                                RCU1210
      THL=2.*HL                                                             RCU1220
270   AN=AN+1.                                                              RCU1230
      A4=0.                                                                 RCU1240
      A5=0.                                                                 RCU1250
      A6=0.                                                                 RCU1260
      A7=0.                                                                 RCU1270
      C5=AN*THL                                                             RCU1280
      CC=CA-C5                                                              RCU1290
      CD=CB-C5                                                              RCU1300
      CE=CA+C5                                                              RCU1310
      CF=CB+C5                                                              RCU1320
      C6=CC*CC/C2                                                           RCU1330
      C7=CD*CD/C2                                                           RCU1340
      C8=CE*CE/C2                                                           RCU1350
      C9=CF*CF/C2                                                           RCU1360
      IF (C6-50.) 280,290,290                                               RCU1370
280   A4=1./EXP(C6)                                                         RCU1380
290   IF (C7-50.) 300,310,310                                               RCU1390
300   A5=1./EXP(C7)                                                         RCU1400
310   IF (C8-50.) 320,330,330                                               RCU1410
320   A6=1./EXP(C8)                                                         RCU1420
330   IF (C9-50.) 340,350,350                                               RCU1430
340   A7=1./EXP(C9)                                                         RCU1440
350   T=A4+A5+A6+A7                                                         RCU1450
      SUM=SUM+T                                                             RCU1460
      IF (T-0.01) 360,270,270                                               RCU1470
360   RC=A1*(A2+A3+SUM)                                                     RCU1480
      RETURN                                                                RCU1490
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR      RCU1500
C        HEIGHT.                                                            RCU1510
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370   A1=1./(6.28318*U*SY*SZ*C1)                                        RCU1520
      A2=0.                                                             RCU1530
      C2=2.*SZ*SZ                                                       RCU1540
      C3=H*H/C2                                                         RCU1550
      IF (C3-50.) 380,390,390                                           RCU1560
380   A2=2./EXP(C3)                                                     RCU1570
390   SUM=0.                                                            RCU1580
      THL=2.*HL                                                         RCU1590
400   AN=AN+1.                                                          RCU1600
      A4=0.                                                             RCU1610
      A6=0.                                                             RCU1620
      C5=AN*THL                                                         RCU1630
      CC=H-C5                                                           RCU1640
      CE=H+C5                                                           RCU1650
      C6=CC*CC/C2                                                       RCU1660
      C8=CE*CE/C2                                                       RCU1670
      IF (C6-50.) 410,420,420                                           RCU1680
410   A4=2./EXP(C6)                                                     RCU1690
420   IF (C8-50.) 430,440,440                                           RCU1700
430   A6=2./EXP(C8)                                                     RCU1710
440   T=A4+A6                                                           RCU1720
      SUM=SUM+T                                                         RCU1730
      IF (T-0.01) 450,400,400                                           RCU1740
450   RC=A1*(A2+SUM)                                                    RCU1750
      RETURN                                                            RCU1760
C                                                                       RCU1770
460   FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABL RCU1780
     1E COMPUTATION CAN NOT BE MADE.')                                  RCU1790
C                                                                       RCU1800
      END                                                               RCU1810
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      SUBROUTINE JMHFIN (NB,LINE1,LINE2,LINE3)                          FIN0010
C***THIS ROUTINE IS RESPONSIBLE FOR PRINTING TABLES OF TOTAL AND        FIN0020
C***AVERAGE CONCENTRATION FROM SIGNIFICANT POINT AND AREA SOURCES.      FIN0030
C***A SUMMARY TABLE OF THE METEOROLOGICAL CONDITIONS FOR EACH HOUR      FIN0040
C***AND THE RESULTANT CONDITIONS FOR THE PERIOD(IF LESS THAN 24 HOURS)  FIN0050
C***IS ALSO PRINTED. CONCENTRATIONS ARE PRINTED IN MICROGRAMS PER CUBIC FIN0060
C***METER.                                                              FIN0070
C        INPUT VARIABLES ARE:                                           FIN0080
C        NB- START HOUR OF AVERAGING TIME                               FIN0090
C        LINE1- FIRST LINE OF TITLE                                     FIN0100
C        LINE2- SECOND LINE OF TITLE                                    FIN0110
C        LINE3- THIRD LINE OF TITLE                                     FIN0120
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR FIN0130
     1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S FIN0140
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)  FIN0150
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA FIN0160
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR FIN0170
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)  FIN0180
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE FIN0190
     1(2)                                                               FIN0200
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                   FIN0210
      DIMENSION GRANDT(150), IRANK(150), GRANDS(150), IPOLT(2), LINE1(14 FIN0220
     1), LINE2(14), LINE3(14)                                           FIN0230
      DATA IPOLT /'SO2 ','PART'/                                        FIN0240
      IPOLU=IPOLT(1)                                                    FIN0250
      IF (IPOL.EQ.4) IPOLU=IPOLT(2)                                     FIN0260
C***AVERAGE CONCENTRATIONS OVER SPECIFIED TIME PERIOD                   FIN0270
      DO 30 K=1,NRECEP                                                  FIN0280
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      ACHI(K)=ACHI(K)/NAVG                                              FIN0290
      PCHI(K)=PCHI(K)/NAVG                                              FIN0300
      GRANDT(K)=ACHI(K)+PCHI(K)                                         FIN0310
      GRANDS(K)=GRANDT(K)                                               FIN0320
      DO 10 I=1,11                                                      FIN0330
10    ASIGS(K,I)=ASIGS(K,I)/NAVG                                        FIN0340
      DO 20 I=1,26                                                      FIN0350
20    PSIGS(K,I)=PSIGS(K,I)/NAVG                                        FIN0360
30    CONTINUE                                                          FIN0370
C***                                                                    FIN0380
C***WRITE POINT SOURCE TABLE                                            FIN0390
      IF (IOPT(1).EQ.0) GO TO 110                                       FIN0400
      WRITE (IO,180) LINE1,LINE2,LINE3                                  FIN0410
      WRITE (IO,190) NAVG,IPOLU,IDATE,NB                                FIN0420
      IF (NSIGP.GT.10) GO TO 50                                         FIN0430
C***PRINT FIRST PAGE OF OUTPUT AND TOTALS                               FIN0440
      WRITE (IO,200) (I,I=1,NSIGP)                                      FIN0450
      WRITE (IO,210)                                                    FIN0460
      WRITE (IO,220) (MPS(I),I=1,NSIGP)                                 FIN0470
      WRITE (IO,230)                                                    FIN0480
      DO 40 K=1,NRECEP                                                  FIN0490
      WRITE (IO,240) K,(PSIGS(K,I),I=1,NSIGP)                           FIN0500
C***PRINT TOTALS***                                                     FIN0510
      WRITE (IO,250) PSIGS(K,26),PCHI(K)                                FIN0520
40    CONTINUE                                                          FIN0530
      GO TO 110                                                         FIN0540
C***PRINT FIRST PAGE                                                    FIN0550
50    WRITE (IO,200) (I,I=1,10)                                         FIN0560
      WRITE (IO,260) (MPS(I),I=1,10)                                    FIN0570
      WRITE (IO,230)                                                    FIN0580
      DO 60 K=1,NRECEP                                                  FIN0590
60    WRITE (IO,240) K,(PSIGS(K,I),I=1,10)                              FIN0600
      IF (NSIGP.GT.20) GO TO 80                                         FIN0610
C***PRINT SECOND PAGE AND TOTALS                                        FIN0620
      WRITE (IO,180) LINE1,LINE2,LINE3                                  FIN0630
      WRITE (IO,190) NAVG,IPOLU,IDATE,NB                                FIN0640
      WRITE (IO,200) (I,I=11,NSIGP)                                     FIN0650
      WRITE (IO,210)                                                    FIN0660
      WRITE (IO,220) (MPS(I),I=11,NSIGP)                                FIN0670
      WRITE (IO,230)                                                    FIN0680
      DO 70 K=1,NRECEP                                                  FIN0690
      WRITE (IO,240) K,(PSIGS(K,I),I=11,NSIGP)                          FIN0700
70    WRITE (IO,250) PSIGS(K,26),PCHI(K)                                FIN0710
      GO TO 110                                                         FIN0720
C***WRITE SECOND PAGE***                                                FIN0730
80    WRITE (IO,180) LINE1,LINE2,LINE3                                  FIN0740
      WRITE (IO,190) NAVG,IPOLU,IDATE,NB                                FIN0750
      WRITE (IO,200) (I,I=11,20)                                        FIN0760
      WRITE (IO,260) (MPS(I),I=11,20)                                   FIN0770
      WRITE (IO,230)                                                    FIN0780
      DO 90 K=1,NRECEP                                                  FIN0790
90    WRITE (IO,240) K,(PSIGS(K,I),I=11,20)                             FIN0800
      WRITE (IO,180) LINE1,LINE2,LINE3                                  FIN0810
      WRITE (IO,190) NAVG,IPOLU,IDATE,NB                                FIN0820
C***WRITE LAST PAGE AND TOTALS***                                       FIN0830
      WRITE (IO,200) (I,I=21,NSIGP)                                     FIN0840
      WRITE (IO,210)                                                    FIN0850
      WRITE (IO,220) (MPS(I),I=21,NSIGP)                                FIN0860
      WRITE (IO,230)                                                    FIN0870
      DO 100 K=1,NRECEP                                                 FIN0880
      WRITE (IO,240) K,(PSIGS(K,I),I=21,NSIGP)                          FIN0890
100   WRITE (IO,250) PSIGS(K,26),PCHI(K)                                FIN0900
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C***                                                                    FIN0910
C***WRITE AREA SOURCE TABLE                                             FIN0920
110   IF (IOPT(2).EQ.0) GO TO 130                                       FIN0930
      WRITE (IO,180) LINE1,LINE2,LINE3                                  FIN0940
      WRITE (IO,270) NAVG,IPOLU,IDATE,NB                                FIN0950
      WRITE (IO,200) (I,I=1,NSIGA)                                      FIN0960
      WRITE (IO,280)                                                    FIN0970
      WRITE (IO,220) (MAS(I),I=1,NSIGA)                                 FIN0980
      WRITE (IO,230)                                                    FIN0990
      DO 120 K=1,NRECEP                                                 FIN1000
      WRITE (IO,240) K,(ASIGS(K,I),I=1,NSIGA)                           FIN1010
120   WRITE (IO,250) ASIGS(K,11),ACHI(K)                                FIN1020
C***                                                                    FIN1030
C***OUTPUT SUMMARY TABLE                                                FIN1040
C***                                                                    FIN1050
130   WRITE (IO,180) LINE1,LINE2,LINE3                                  FIN1060
      WRITE (IO,290) NAVG,IPOLU,IDATE,NB                                FIN1070
      WRITE (IO,300)                                                    FIN1080
C***CALCULATE GRAND TOTALS AND RANK CONCENTRATIONS                       FIN1090
      DO 150 I=1,NRECEP                                                 FIN1100
      CMAX=-1.0                                                         FIN1110
      DO 140 K=1,NRECEP                                                 FIN1120
      IF (GRANDT(K).LE.CMAX) GO TO 140                                  FIN1130
      CMAX=GRANDT(K)                                                    FIN1140
      LMAX=K                                                            FIN1150
140   CONTINUE                                                          FIN1160
      IRANK(LMAX)=I                                                     FIN1170
      GRANDT(LMAX)=-1.0                                                 FIN1180
150   CONTINUE                                                          FIN1190
      DO 160 K=1,NRECEP                                                 FIN1200
      C1=RREC(K)*UNITS                                                  FIN1210
      C2=SREC(K)*UNITS                                                  FIN1220
      WRITE (IO,310) K,ITYPE(K),ICODE(K),C1,C2,PSIGS(K,26),PCHI(K),ASIGS FIN1230
     1(K,11),ACHI(K),GRANDS(K),IRANK(K)                                 FIN1240
160   CONTINUE                                                          FIN1250
      IF (IOPT(10).EQ.0) RETURN                                         FIN1260
C***PUNCH CONCENTRATIONS FOR CONTOURING(MICROGRAMS/CUBIC METER)          FIN1270
C***RECEPTOR COORDINATES IN USER UNITS.                                 FIN1280
      DO 170 K=1,NRECEP                                                 FIN1290
      C1=RREC(K)*UNITS                                                  FIN1300
      C2=SREC(K)*UNITS                                                  FIN1310
      GWU=GRANDS(K)*1.0E+06                                             FIN1320
      AWU=ACHI(K)*1.0E+06                                               FIN1330
      PWU=PCHI(K)*1.0E+06                                               FIN1340
      WRITE (1,320) C1,C2,GWU,AWU,PWU,K                                 FIN1350
170   CONTINUE                                                          FIN1360
      RETURN                                                            FIN1370
C                                                                       FIN1380
180   FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                        FIN1390
190   FORMAT ('0',T22,I2,'-HOUR AVERAGE ',A4,' CONTRIBUTION(MICROGRAMS/M FIN1400
     1**3) FROM SIGNIFICANT POINT SOURCES',5X,I2,'/',I3,'  START HOUR: ' FIN1410
     2,I2//1X,T5,'RANK')                                                FIN1420
200   FORMAT ('+',T12,10(I3,7X))                                        FIN1430
210   FORMAT ('+',T113,'TOTAL     TOTAL'/1X,T113,'SIGNIF    ALL POINT'/1 FIN1440
     1X,T113,'POINT     SOURCES'/1X,'SOURCE #')                         FIN1450
220   FORMAT ('+',T12,10(I3,7X))                                        FIN1460
230   FORMAT (1X,'RECEP #')                                             FIN1470
240   FORMAT (1X,T3,I3,1X,6P10F10.3)                                    FIN1480
250   FORMAT ('+',T109,6P2F10.3)                                        FIN1490
260   FORMAT (1X,'SOURCE #',T12,10(I3,7X))                              FIN1500
270   FORMAT ('0',T22,I2,'-HOUR AVERAGE ',A4,' CONTRIBUTION(MICROGRAMS/M FIN1510
     1**3) FROM SIGNIFICANT AREA SOURCES',5X,I2,'/',I3,'  START HOUR: ', FIN1520
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     2I2//1X,T5,'RANK')                                                    FIN1530
280   FORMAT ('+',T113,'TOTAL     TOTAL'/1X,T113,'SIGNIF    'ALL AREA'/1X FIN1540
     1,T113,'AREA      SOURCES'/1X,'SOURCE #')                            FIN1550
290   FORMAT ('0',T25,I2,'-HOUR AVERAGE ',A4,' SUMMARY CONCENTRATION TAB FIN1560
     1LE(MICROGRAMS/M**3)',5X,I2,'/',I3,'  START HOUR: ',I2//1X)          FIN1570
300   FORMAT (1X,'RECEPTOR NO.   EAST      NORTH     ',2X,5('TOTAL FROM  FIN1580
     1'),'CONCENTRATION'/1X,T36,'SIGNIF POINT  ALL POINT   SIGNIF AREA   FIN1590
     2 ALL AREA     ALL SOURCES',5X,'RANK'/1X,T38,4('SOURCES',6X)//1X)    FIN1600
310   FORMAT (1X,T3,I3,1X,A1,I3,6X,F7.2,2X,F7.2,1X,6P5F13.4,6X,I3)         FIN1610
320   FORMAT ('CNTL',1X,5F10.3,I4)                                        FIN1620
C                                                                         FIN1630
      END                                                                 FIN1640


      SUBROUTINE JMHREC                                                   REC0010
C***THE PURPOSE OF THIS SUBROUTINE IS TO DETERMINE RECEPTORS FROM         REC0020
C***SIGNIFICANT SOURCES.                                                  REC0030
      COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),AXCO REC0040
     1F(6,9),AXEXP(6,9),HC1(10)                                           REC0050
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR REC0060
     1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S REC0070
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)   REC0080
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA REC0090
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR REC0100
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)   REC0110
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                     REC0120
      DATA ICHAR /'P'/ ,JCHAR /'A'/                                       REC0130
      IF (IOPT(1).EQ.0) GO TO 110                                         REC0140
      IF (IOPT(4).EQ.0) GO TO 110                                         REC0150
      WRITE (IO,200)                                                      REC0160
C                                                                         REC0170
C***LOOP ON SIGNIFICANT POINT SOURCES                                     REC0180
C                                                                         REC0190
      DO 100 IP=1,NSIGP                                                   REC0200
      X=0.0                                                               REC0210
      I=MPS(IP)                                                           REC0220
C***EAST AND NORTH COORDINATES OF THE SOURCE                              REC0230
      RS=SOURCE(1,I)                                                      REC0240
      SS=SOURCE(2,I)                                                      REC0250
      Q=SOURCE(IPOL,I)                                                    REC0260
C***MODIFY WIND SPEED BY POWER LAW PROFILE IN ORDER TO TAKE INTO          REC0270
C***ACCOUNT THE INCREASE IN WIND SPEED WITH HEIGHT.                       REC0280
      UPL=U*(SOURCE(5,I)/10.)**PL(KST)                                    REC0290
C***CALCULATE PLUME RISE                                                  REC0300
      TS=SOURCE(6,I)                                                      REC0310
      IF (TS.GT.TEMP) GO TO 10                                            REC0320
      HF=SOURCE(5,I)                                                      REC0330
      GO TO 70                                                            REC0340
10    F=SOURCE(9,I)*(TS-TEMP)/TS                                          REC0350
      GO TO (20,20,20,20,40,50), KST                                      REC0360
20    IF (F.GE.55.) GO TO 30                                              REC0370
      HF=SOURCE(5,I)+21.425*F**0.75/UPL                                   REC0380
      GO TO 70                                                            REC0390
30    HF=SOURCE(5,I)+38.71*F**0.6/UPL                                     REC0400
      GO TO 70                                                            REC0410
40    DTHDZ=0.02                                                          REC0420
      GO TO 60                                                            REC0430
50    DTHDZ=0.035                                                         REC0440
60    S=9.80616*DTHDZ/TEMP                                                REC0450
      HF=SOURCE(5,I)+2.6*(F/(UPL*S))**0.333333                            REC0460
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C***DETERMINE PROPER HEIGHT CLASS                                        REC0470
70      DO 80 IH=2,10                                                    REC0480
        IF (HF.LT.(HC1(IH)-.01)) GO TO 90                                REC0490
80      CONTINUE                                                         REC0500
        IH=10                                                            REC0510
90      IS=IH-1                                                          REC0520
C***CALCULATE RELATIVE CONC. NORMALIZED FOR WIND SPEED                   REC0530
        A=PXUCOF(KST,IS)                                                 REC0540
        B=PXUEXP(KST,IS)                                                 REC0550
        CONM=A*HF**B*Q/UPL                                               REC0560
C***CALCULATE DISTANCE TO MAX. CONC. FROM POINT SOURCE.                  REC0570
        C=PXCOF(KST,IS)                                                  REC0580
        D=PXEXP(KST,IS)                                                  REC0590
C*** X IN KM.                                                            REC0600
        X=C*HF**D                                                        REC0610
C***DO NOT ALLOW  RECEPTORS BEYOND 1000 KM.                              REC0611
        IF(X.GT.1000.) GO TO 100                                         REC0612
        NRECEP=NRECEP+2                                                  REC0620
        IF (NRECEP.GT.150) GO TO 190                                     REC0630
C                                                                        REC0640
C***TWO RECEPTORS ARE GENERATED FOR EACH SIGNIFICANT POINT SOURCE.       REC0650
C***RECEPTORS ARE LOCATED AT A DISTANCE OF X AND AT 2X.                  REC0660
C***X IS THE LOCATION WHERE THE HIGHEST CONCENTRATION FROM THE IP-TH      REC0670
C***POINT SOURCE IS EXPECTED. A RECEPTOR IS LOCATED AT A DISTANCE OF 2X  REC0680
C*** TO ALLOW FOR THE INTERSECTION OF PLUMES FROM SEVERAL POINT SOURCES.  REC0690
C***THE CHARACTERS "A" FOR AREA SOURCE AND "P" FOR POINT SOURCES          REC0700
C***SIGNIFY WHICH TYPE OF SOURCE CAUSED THE GENERATION OF A              REC0710
C***SPECIFIC RECEPTOR.                                                   REC0720
        K=NRECEP-1                                                       REC0730
        ITYPE(K)=ICHAR                                                   REC0740
        ICODE(K)=I                                                       REC0750
C***CALCULATE EAST AND NORTH COORDINATES(INTERNAL UNITS) OF THE RECEPTOR  REC0760
C***SINT AND COST REFER TO THE SINE AND COSINE OF THE RESULTANT WIND DIR  REC0770
        RREC(K)=RS-X*SINT/CONTWO                                         REC0780
        SREC(K)=SS-X*COST/CONTWO                                         REC0790
C***CONVERT TO USER UNITS FOR PRINT OUT.                                 REC0800
        C1=RREC(K)*UNITS                                                 REC0810
        C2=SREC(K)*UNITS                                                 REC0820
        WRITE (IO,210) K,ICHAR,I,C1,C2,CONM,X,HF,UPL                     REC0830
        X=2.0*X                                                          REC0840
        ITYPE(NRECEP)=ICHAR                                              REC0850
        ICODE(NRECEP)=I                                                  REC0860
        RREC(NRECEP)=RS-X*SINT/CONTWO                                    REC0870
        SREC(NRECEP)=SS-X*COST/CONTWO                                    REC0880
C***CONVERT TO USER UNITS FOR PRINT OUT.                                 REC0890
        C1=RREC(NRECEP)*UNITS                                            REC0900
        C2=SREC(NRECEP)*UNITS                                            REC0910
        WRITE (IO,220) NRECEP,ICHAR,I,C1,C2,X,HF,UPL                     REC0920
100     CONTINUE                                                         REC0930
C                                                                        REC0940
C***LOOP ON SIGNIFICANT AREA SOURCES                                     REC0950
C***ONE RECEPTOR IS LOCATED ON THE DOWNWIND AZIMUTH FROM THE CENTER OF   REC0960
C***EACH SIGNIFICANT AREA SOURCE AT A DISTANCE WHERE MAXIMUM             REC0970
C***CONCENTRATIONS IS EXPECTED.                                          REC0980
C                                                                        REC0990
110     IF (IOPT(2).EQ.0) GO TO 180                                      REC1000
        IF (IOPT(5).EQ.0) GO TO 180                                      REC1010
        WRITE (IO,230)                                                   REC1020
        DO 170 IP=1,NSIGA                                                REC1030
        I=MAS(IP)                                                        REC1040
        WA=ASORC(5,I)                                                    REC1050
C***LOCATE SOURCE CENTER                                                 REC1060
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      RS=ASORC(1,I)+WA                                                  REC1070
      SS=ASORC(2,I)+WA                                                  REC1080
      H=ASORC(6,I)                                                      REC1090
C***DETERMINE HEIGHT CLASS                                              REC1100
C***IS = 1 FOR H LESS THA 20 METERS.                                    REC1110
C***IS = 2 FOR H FROM 20 TO 30 METERS.                                  REC1120
C***IS = 3 FOR H FROM 30 TO 50 METERS.                                  REC1130
      DO 120 IH=2,3                                                     REC1140
      IF (H.LT.HC1(IH)-0.01) GO TO 130                                  REC1150
120   CONTINUE                                                          REC1160
      IH=4                                                              REC1170
130   IS=IH-1                                                           REC1180
C***CALCULATE DISTANCE(KM) TO MAXIMUM CONCENTRATION.                    REC1190
      C=AXCOF(KST,IS)                                                   REC1200
      D=AXEXP(KST,IS)                                                   REC1210
      X=C*H**D                                                          REC1220
      IF (COST.EQ.0.) GO TO 140                                         REC1230
      A=ABS(WA/COST)                                                    REC1240
      IF (SINT.EQ.0.) GO TO 150                                         REC1250
      B=ABS(WA/SINT)                                                    REC1260
      AB=AMIN1(A,B)                                                     REC1270
      GO TO 160                                                         REC1280
140   AB=ABS(WA/SINT)                                                   REC1290
      GO TO 160                                                         REC1300
150   AB=A                                                              REC1310
160   X=X+AB*CONTWO                                                     REC1320
      NRECEP=NRECEP+1                                                   REC1330
C***NO MORE THAN 150 RECEPTORS ARE ALLOWED.                             REC1340
      IF (NRECEP.GT.150) GO TO 190                                      REC1350
      RREC(NRECEP)=RS-X*SINT/CONTWO                                     REC1360
      SREC(NRECEP)=SS-X*COST/CONTWO                                     REC1370
      C1=RREC(NRECEP)*UNITS                                             REC1380
      C2=SREC(NRECEP)*UNITS                                             REC1390
      WRITE (IO,210) NRECEP,JCHAR,I,C1,C2                               REC1400
      ITYPE(NRECEP)=JCHAR                                               REC1410
      ICODE(NRECEP)=I                                                   REC1420
170   CONTINUE                                                          REC1430
180   RETURN                                                            REC1440
190   WRITE (IO,240)                                                    REC1450
      NRECEP=150                                                        REC1460
      RETURN                                                            REC1470
C                                                                       REC1480
200   FORMAT (1X////1X,T9,'SIGNIFICANT POINT RECEPTORS'//1X,'RECEPTOR #  REC1490
     1 EAST      NORTH     PREDICTED MAX CONC.  MAX. DIST  EFF. HT     U(PH REC1500
     2Y HT)'/1X,T34,'(MICROGRAMS/M**3)',T55,'(KM)',T66,'(M)',T76,'(M/SEC REC1510
     3)'/1X)                                                            REC1520
210   FORMAT (1X,T2,I3,1X,A1,I3,4X,F6.2,3X,F7.2,4X,6PF12.2,5X,0P3F10.3)  REC1530
220   FORMAT (1X,T2,I3,1X,A1,I3,4X,F6.2,3X,F7.2,21X,3F10.3)             REC1540
230   FORMAT (1X////1X,T9,'SIGNIFICANT AREA SOURCE RECEPTORS'//1X,'RECEP REC1550
     1TOR #  EAST      NORTH     '//1X)                                 REC1560
240   FORMAT (' THE MAXIMUM NO. OF RECEPTORS HAS BEEN GENERATED'//1X,' N REC1570
     1O OTHERS WILL BE ACCEPTED')                                       REC1580
C                                                                       REC1590
      END                                                               REC1600



      SUBROUTINE JMHOUR (LH,LINE1,LINE2,LINE3)                          HOUR010
C***THE PURPOSE OF THIS SUBROUTINE IS TO OUTPUT A TABLE OF PARTIAL      HOUR020
C***CONTRIBUTIONS FROM SIGNIFICANT POINT AND AREA SOURCES FOR THE       HOUR030
C***CURRENT HOUR. OR, IF DESIRED, A SUMMARY TABLE LISTING FOR EACH      HOUR040
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C***RECEPTOR: THE TOTAL CONCENTRATION FROM SIGNIFICANT POINT SOURCES,     HOUR050
C***SIGNIFICANT AREA SOURCES, TOTALS FROM ALL POINT AND AREA SOURCES      HOUR060
C***AND FINALLY THE TOTAL CONTRIBUTIONS FROM ALL SOURCES, CAN BE         HOUR070
C***OBTAINED INSTEAD OF OR IN ADDITION TO THE PARTIAL CONCENTRATION       HOUR080
C***TABLE. CONCENTRATIONS ARE PRINTED IN MICROGRAMS PER CUBIC METER.     HOUR090
C       INPUT VARIABLES...                                               HOUR100
C          LH-CURRENT HOUR                                               HOUR110
C          LINE1-FIRST LINE OF TITLE                                     HOUR120
C          LINE2-SECOND LINE OF TITLE                                    HOUR130
C          LINE3-THIRD LINE OF TITLE                                     HOUR140
       COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR HOUR150
      1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S HOUR160
      2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)  HOUR170
       COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA HOUR180
      1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR HOUR190
      2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)  HOUR200
       COMMON /HEIGHT/ HINT(3),HARE(3),BPHH(2),FH                        HOUR210
       COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE HOUR220
      1(2)                                                               HOUR230
       COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                   HOUR240
       DIMENSION GRANDT(150), IRANK(150), GRANDS(150), LINE1(14), LINE2(1 HOUR250
      14), LINE3(14)                                                     HOUR260
       IF (IOPT(9).EQ.1) GO TO 100                                       HOUR270
C***                                                                     HOUR280
C***WRITE POINT SOURCE TABLE                                             HOUR290
C***                                                                     HOUR300
       IF (IOPT(1).EQ.0) GO TO 80                                        HOUR310
       WRITE (IO,150) LINE1,LINE2,LINE3                                  HOUR320
       WRITE (IO,160) IDATE,LH                                           HOUR330
       IF (NSIGP.GT.10) GO TO 20                                         HOUR340
C***PRINT FIRST PAGE OF OUTPUT AND TOTALS                                HOUR350
       WRITE (IO,170) (I,I=1,NSIGP)                                      HOUR360
       WRITE (IO,180)                                                    HOUR370
       WRITE (IO,190) (MPS(I),I=1,NSIGP)                                 HOUR380
       WRITE (IO,200)                                                    HOUR390
       DO 10 K=1,NRECEP                                                  HOUR400
       WRITE (IO,210) K,(PHSIGS(K,I),I=1,NSIGP)                          HOUR410
C***PRINT TOTALS***                                                      HOUR420
       WRITE (IO,220) PHSIGS(K,26),PHCHI(K)                              HOUR430
10     CONTINUE                                                          HOUR440
       GO TO 80                                                          HOUR450
C***PRINT FIRST PAGE                                                     HOUR460
20     WRITE (IO,170) (I,I=1,10)                                         HOUR470
       WRITE (IO,230) (MPS(I),I=1,10)                                    HOUR480
       WRITE (IO,200)                                                    HOUR490
       DO 30 K=1,NRECEP                                                  HOUR500
30     WRITE (IO,210) K,(PHSIGS(K,I),I=1,10)                             HOUR510
       IF (NSIGP.GT.20) GO TO 50                                         HOUR520
C***PRINT SECOND PAGE AND TOTALS                                         HOUR530
       WRITE (IO,150) LINE1,LINE2,LINE3                                  HOUR540
       WRITE (IO,160) IDATE,LH                                           HOUR550
       WRITE (IO,170) (I,I=11,NSIGP)                                     HOUR560
       WRITE (IO,180)                                                    HOUR570
       WRITE (IO,190) (MPS(I),I=11,NSIGP)                                HOUR580
       WRITE (IO,200)                                                    HOUR590
       DO 40 K=1,NRECEP                                                  HOUR600
       WRITE (IO,210) K,(PHSIGS(K,I),I=11,NSIGP)                         HOUR610
40     WRITE (IO,220) PHSIGS(K,26),PHCHI(K)                              HOUR620
       GO TO 80                                                          HOUR630
C***WRITE SECOND PAGE                                                    HOUR640
50     WRITE (IO,150) LINE1,LINE2,LINE3                                  HOUR650
       WRITE (IO,160) IDATE,LH                                           HOUR660
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      WRITE (IO,170) (I,I=11,20)                                          HOUR670
      WRITE (IO,230) (MPS(I),I=11,20)                                     HOUR680
      WRITE (IO,200)                                                      HOUR690
      DO 60 K=1,NRECEP                                                    HOUR700
60    WRITE (IO,210) K,(PHSIGS(K,I),I=11,20)                              HOUR710
      WRITE (IO,150) LINE1,LINE2,LINE3                                    HOUR720
      WRITE (IO,160) IDATE,LH                                             HOUR730
C***WRITE LAST PAGE AND TOTALS                                            HOUR740
      WRITE (IO,170) (I,I=21,NSIGP)                                       HOUR750
      WRITE (IO,180)                                                      HOUR760
      WRITE (IO,190) (MPS(I),I=21,NSIGP)                                  HOUR770
      WRITE (IO,200)                                                      HOUR780
      DO 70 K=1,NRECEP                                                    HOUR790
      WRITE (IO,210) K,(PHSIGS(K,I),I=21,NSIGP)                           HOUR800
70    WRITE (IO,220) PHSIGS(K,26),PHCHI(K)                                HOUR810
C***                                                                      HOUR820
C***WRITE AREA SOURCE TABLE                                               HOUR830
C***                                                                      HOUR840
80    IF (IOPT(2).EQ.0) GO TO 100                                         HOUR850
      WRITE (IO,150) LINE1,LINE2,LINE3                                    HOUR860
      WRITE (IO,300) HARE,BPHM                                            HOUR870
      WRITE (IO,240) IDATE,LH                                             HOUR880
      WRITE (IO,170) (I,I=1,NSIGA)                                        HOUR890
      WRITE (IO,250)                                                      HOUR900
      WRITE (IO,190) (MAS(I),I=1,NSIGA)                                   HOUR910
      WRITE (IO,200)                                                      HOUR920
      DO 90 K=1,NRECEP                                                    HOUR930
      WRITE (IO,210) K,(AHSIGS(K,I),I=1,NSIGA)                            HOUR940
90    WRITE (IO,220) AHSIGS(K,11),AHCHI(K)                                HOUR950
C                                                                         HOUR960
C***OUTPUT SUMMARY TABLE                                                  HOUR970
C                                                                         HOUR980
100   WRITE (IO,150) LINE1,LINE2,LINE3                                    HOUR990
      WRITE (IO,260) IDATE,LH                                             HOUR000
      WRITE (IO,270)                                                      HOUR010
      WRITE (IO,280) LH,QTHETA(LH),QU(LH),QHL(LH),QTEMP(LH),IKST(LH)      HOUR020
      IF(IOPT(2).EQ.1) WRITE (IO,300) HARE,BPHM                           HOUR030
      WRITE (IO,290)                                                      HOUR040
C***CALCULATE GRAND TOTALS AND RANK CONCENTRATIONS                        HOUR050
      DO 110 K=1,NRECEP                                                   HOUR060
      GRANDT(K)=AHCHI(K)+PHCHI(K)                                         HOUR070
110   GRANDS(K)=GRANDT(K)                                                 HOUR080
C***DETERMINE RANKING ACCORDING TO CONCENTRATION                          HOUR090
      DO 130 I=1,NRECEP                                                   HOUR100
      CMAX=-1.0                                                           HOUR110
      DO 120 K=1,NRECEP                                                   HOUR120
      IF (GRANDT(K).LE.CMAX) GO TO 120                                    HOUR130
      CMAX=GRANDT(K)                                                      HOUR140
      LMAX=K                                                              HOUR150
120   CONTINUE                                                            HOUR160
      IRANK(LMAX)=I                                                       HOUR170
      GRANDT(LMAX)=-1.0                                                   HOUR180
130   CONTINUE                                                            HOUR190
      DO 140 K=1,NRECEP                                                   HOUR200
      C1=RREC(K)*UNITS                                                    HOUR210
      C2=SREC(K)*UNITS                                                    HOUR220
      WRITE (IO,310) K,ITYPE(K),ICODE(K),C1,C2,PHSIGS(K,26),PHCHI(K),AHS  HOUR230
     1IGS(K,11),AHCHI(K),GRANDS(K),IRANK(K)                               HOUR240
140   CONTINUE                                                            HOUR250
      RETURN                                                              HOUR260
C                                                                         HOUR270
150   FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                          HOUR280
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160   FORMAT ('0',T30,'CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT PO HOUR290
     1INT SOURCES ',5X,I2,'/',I4,' : HOUR ',I2//1X,T5,'RANK')           HOUR300
170   FORMAT ('+',T12,10(I3,7X))                                        HOUR310
180   FORMAT ('+',T113,'TOTAL      TOTAL'/1X,T113,'SIGNIF    ALL POINT'/1 HOUR320
     1X,T113,'POINT     SOURCES'/1X,'SOURCE #')                         HOUR330
190   FORMAT ('+',T12,10(I3,7X))                                        HOUR340
200   FORMAT (1X,'RECEP #')                                             HOUR350
210   FORMAT (1X,T3,I3,1X,6P10F10.3)                                    HOUR360
220   FORMAT ('+',T109,6P2F10.3)                                        HOUR370
230   FORMAT (1X,'SOURCE #',T12,10(I3,7X))                              HOUR380
240   FORMAT ('0',T30,'CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT AR HOUR390
     1EA SOURCES',5X,I2,'/',I4,' : HOUR ',I2//1X,T5,'RANK')            HOUR400
250   FORMAT ('+',T113,'TOTAL      TOTAL'/1X,T113,'SIGNIF    ALL AREA'/1X HOUR410
     1,T113,'AREA       SOURCES'/1X,'SOURCE #')                         HOUR420
260   FORMAT ('0',T25,'SUMMARY CONCENTRATION TABLE(MICROGRAMS/M**3) ',5X HOUR430
     1,I2,'/',I4,' : HOUR ',I2/1X)                                     HOUR440
270   FORMAT (1X,T2,'HOUR    THETA    SPEED    MIXING    TEMP    STABILITY'/ HOUR450
     11X,T9,'(DEG)     (M/S) HEIGHT(M)    (K)      CLASS'/1X)         HOUR460
280   FORMAT (1X,T3,I2,4F9.2,6X,I1)                                     HOUR470
290   FORMAT ('0RECEPTOR NO.    EAST      NORTH     ',2X,5('TOTAL FROM   ') HOUR480
     1,'CONCENTRATION'/1X,T36,'SIGNIF POINT  ALL POINT   SIGNIF AREA    HOUR490
     2ALL AREA     ALL SOURCES',5X,'RANK'/1X,T38,4('SOURCES',6X)/1X)    HOUR500
300   FORMAT (' ',T60,'AREA HTS:  ',F4.0,',',F4.0,',',F4.0,';  SEPARATI HOUR510
     1ON HTS:  ',F4.0,',',F4.0)                                        HOUR520
310   FORMAT (1X,T3,I3,1X,A1,I3,6X,F7.2,2X,F7.2,1X,6P5F13.4,6X,I3)      HOUR530
C                                                                       HOUR540
      END                                                               HOUR550


      SUBROUTINE JHHHON (GRIDSP)                                        HON0010
C***THIS ROUTINE GENERATES RECEPTORS IN A HONEYCOMB ARRANGEMENT.        HON0020
C       INPUT VARIABLE...                                               HON0030
C          GRIDSP- DISTANCE BETWEEN GENERATED RECEPTORS(USER UNITS)      HON0040
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR HON0050
     1EC(150),SREC(150),NPS(25),NAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S HON0060
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)  HON0070
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA HON0080
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR HON0090
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)  HON0100
      COMMON /HCGRID/ HRMIN,HRMAX,HSMIN,HSMAX                           HON0110
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                   HON0120
      DIMENSION HCOMBR(250), HCOMBS(250)                                HON0130
C***THE CHARACTER 'H' IDENTIFIES A RECEPTOR WHICH WAS GENERATED BY THIS HON0140
C*** ROUTINE.                                                           HON0150
      DATA ICHAR /'H'/                                                  HON0160
C                                                                       HON0170
C***INITIALIZE SPACING PARAMETER FOR RECEPTOR GENERATION.               HON0180
C***THE HORIZONTAL LOCATIONS OF ODD AND EVEN ROWS ARE STAGGERED.        HON0190
C***THE FIRST HORIZONTAL RECEPTOR (EVEN ROW) IS AT A DISTANCE           HON0200
C***OF .5 GRIDSP FROM THE MINIMUM HORIZONTAL  DISTANCE IN CONTRAST      HON0210
C***TO A DISTANCE OF GRIDSP FOR ODD ROWS.                               HON0220
      XINC=GRIDSP*0.5                                                   HON0230
      YINC=GRIDSP*0.866                                                 HON0240
      YCD=HSMIN+YINC/2.                                                 HON0250
      DUM=HRMAX-HRMIN                                                   HON0260
      NCOLS1=DUM/GRIDSP                                                 HON0270
      NCOLS2=(DUM+XINC)/GRIDSP                                          HON0280
      NROWS=(HSMAX-HSMIN)/(2.*YINC)+1.                                  HON0290
      NBEES=0                                                           HON0300
      DO 50 J=1,NROWS                                                   HON0310
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C***THE STARTING LOCATION FOR THE GENERATION OF POSSIBLE HONEYCOMB        HON0320
C***RECEPTORS IS THE SOUTH WEST CORNER OF THE DEFINED HONEYCOMB GRID      HON0330
C***AREA.                                                                HON0340
      XCD1=HRMIN                                                         HON0350
      XCD2=HRMIN-XINC                                                    HON0360
C                                                                        HON0370
C***GENERATION OF ODD ROWS.                                              HON0380
C***THE FIRST POINT(ODD ROW) IS LOCATED AT THE DISTANCE OF GRIDSP        HON0390
C***EAST FROM THE SOUTH WEST CORNER.                                     HON0400
C                                                                        HON0410
      DO 10 I=1,NCOLS1                                                   HON0420
      XCD1=XCD1+GRIDSP                                                   HON0430
      IF (XCD1.GT.HRMAX) GO TO 20                                        HON0440
      NBEES=NBEES+1                                                      HON0450
C***NO MORE THAN 250 POSSIBLE RECEPTORS ARE ALLOWED.                     HON0460
      IF (NBEES.GT.250) GO TO 110                                        HON0470
      HCOMBR(NBEES)=XCD1                                                 HON0480
      HCOMBS(NBEES)=YCD                                                  HON0490
10    CONTINUE                                                           HON0500
C***ROWS ARE LOCATED AT A PERPENDICULAR DISTANCE OF .866 TIMES GRIDSP    HON0510
C***ABOVE THE PRECEEDING ROW.                                            HON0520
20    YCD=YCD+YINC                                                       HON0530
      IF (YCD.GT.HSMAX) GO TO 60                                         HON0540
C                                                                        HON0550
C***GENERATION OF EVEN ROWS                                              HON0560
C                                                                        HON0570
      DO 30 I=1,NCOLS2                                                   HON0580
      XCD2=XCD2+GRIDSP                                                   HON0590
      IF (XCD2.GT.HRMAX) GO TO 40                                        HON0600
      NBEES=NBEES+1                                                      HON0610
      IF (NBEES.GT.250) GO TO 110                                        HON0620
      HCOMBR(NBEES)=XCD2                                                 HON0630
      HCOMBS(NBEES)=YCD                                                  HON0640
30    CONTINUE                                                           HON0650
40    YCD=YCD+YINC                                                       HON0660
      IF (YCD.GT.HSMAX) GO TO 60                                         HON0670
50    CONTINUE                                                           HON0680
C                                                                        HON0690
C***ELIMINATE POSSIBLE HONEYCOMB RECEPTORS THAT ARE CLOSE TO OTHER       HON0700
C***RECEPTORS.                                                           HON0710
C                                                                        HON0720
60    NULIM=NRECEP                                                       HON0730
      SLIM=XINC*XINC                                                     HON0740
      DO 90 N=1,NBEES                                                    HON0750
      NR=HCOMBR(N)                                                       HON0760
      NS=HCOMBS(N)                                                       HON0770
C***IF NO PREVIOUS RECEPTORS, THERE WILL BE NO COMPARISONS               HON0780
      IF (NRECEP.LE.0) GO TO 80                                          HON0790
      DO 70 M=1,NULIM                                                    HON0800
      R=RREC(M)                                                          HON0810
      S=SREC(M)                                                          HON0820
      DUM1=ABS(R-NR)                                                     HON0830
      IF (DUM1.GT.XINC) GO TO 70                                         HON0840
      DUM2=ABS(S-NS)                                                     HON0850
      IF (DUM2.GT.XINC) GO TO 70                                         HON0860
      DISQ=DUM1*DUM1+DUM2*DUM2                                           HON0870
C***IF THE DISTANCE BETWEEN A CURRENT RECEPTOR AND A POSSIBLE            HON0880
C***HONEYCOMB RECEPTOR IS LESS THAN HALF THE GRIDSPACING,                HON0890
C***THE POSSIBLE HONEYCOMB RECEPTOR IS DISCARDED.                        HON0900
      IF (DISQ.LT.SLIM) GO TO 90                                         HON0910
70    CONTINUE                                                           HON0920
80    NRECEP=NRECEP+1                                                    HON0930
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C***THE TOTAL NUMBER OF RECEPTORS CAN NOT EXCEED 150.                    HON0940
      IF (NRECEP.GT.150) GO TO 100                                       HON0950
C***ADD NEW RECEPTOR COORDINATES                                         HON0960
      RREC(NRECEP)=RH                                                    HON0970
      SREC(NRECEP)=SH                                                    HON0980
      ITYPE(NRECEP)=ICHAR                                                HON0990
      ICODE(NRECEP)=0                                                    HON1000
      C1=RREC(NRECEP)*UNITS                                              HON1010
      C2=SREC(NRECEP)*UNITS                                              HON1020
      WRITE (IO,120) NRECEP,ICHAR,C1,C2                                  HON1030
90    CONTINUE                                                           HON1040
      RETURN                                                             HON1050
100   WRITE (IO,130)                                                     HON1060
      NRECEP=150                                                         HON1070
      RETURN                                                             HON1080
110   WRITE (IO,140)                                                     HON1090
      CALL EXIT                                                          HON1100
C                                                                        HON1110
120   FORMAT (1X,T3,I3,1X,A1,6X,F6.2,3X,F7.2)                            HON1120
130   FORMAT (' THE MAXIMUM NO. OF RECEPTORS HAS BEEN GENERATED'/1X,' NO HON1130
     1 OTHERS WILL BE ACCEPTED.')                                        HON1140
140   FORMAT (' TOO  MANY POSSIBLE HONEYCOMB RECEPTOR LOCATIONS HAVE ',' HON1150
     1BEEN GENERATED. PLEASE REDEFINE BOUNDARIES OR GRID SPACING.')      HON1160
C                                                                        HON1170
      END                                                                HON1180
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      SUBROUTINE BRSZ (XK,KST,SZ)
C       MCELROY-POOLER URBAN SIGMA Z.                                    BRZ0010
C         XK IS DISTANCE IN KM.                                          BRZ0020
C         KST IS PASQUILL STABILITY CLASS.                               BRZ0030
C         SZ IS IN METERS.                                               BRZ0040
C          CONVERT X TO METERS                                           BRZ0050
      X=1000.*XK                                                         BRZ0060
      GO TO (10,10,20,30,40,40), KST                                     BRZ0070
10    SZ=0.24*X*SQRT(1.+0.001*X)                                         BRZ0080
      GO TO 50                                                           BRZ0090
20    SZ=0.2*X                                                           BRZ0100
      GO TO 50                                                           BRZ0110
30    SZ=0.14*X/SQRT(1.+0.0003*X)                                        BRZ0120
      GO TO 50                                                           BRZ0130
40    SZ=0.08*X/SQRT(1.+0.0015*X)                                        BRZ0140
50    IF (SZ.GT.5000.) SZ=5000.                                          BRZ0150
      RETURN                                                             BRZ0160
C                                                                        BRZ0170
      END                                                                BRZ0180
                                                                         BRZ0190
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      SUBROUTINE BRSYSZ (XK,KST,SY,SZ)
C     MCELROY-POOLER URBAN DISPERSION PARAMETERS FROM ST. LOUIS           BRYZ010
C       EXPERIMENT AS PUT IN EQUATION FORM BY BRIGGS.                    BRYZ020
C         XK IS DISTANCE IN KM.                                          BRYZ030
C         KST IS PASQUILL STABILITY CLASS.                               BRYZ040
C         SY AND SZ ARE IN METERS.                                       BRYZ050
C          CONVERT X TO METERS                                           BRYZ060
      X=1000.*XK                                                         BRYZ070
      GO TO (10,10,20,30,40,40), KST                                     BRYZ080
10    SY=0.32*X/SQRT(1.+0.0004*X)                                        BRYZ090
                                                                         BRYZ100
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      SZ=0.24*X*SQRT(1.+0.001*X)                                        BRYZ110
      GO TO 50                                                          BRYZ120
20    SY=0.22*X/SQRT(1.+0.0004*X)                                       BRYZ130
      SZ=0.2*X                                                          BRYZ140
      GO TO 50                                                          BRYZ150
30    SY=0.16*X/SQRT(1.+0.0004*X)                                       BRYZ160
      SZ=0.14*X/SQRT(1.+0.0003*X)                                       BRYZ170
      GO TO 50                                                          BRYZ180
40    SY=0.11*X/SQRT(1.+0.0004*X)                                       BRYZ190
      SZ=0.08*X/SQRT(1.+0.0015*X)                                       BRYZ200
50    IF (SZ.GT.5000.) SZ=5000.                                         BRYZ210
      RETURN                                                            BRYZ220
C                                                                       BRYZ230
      END                                                               BRYZ240


      BLOCK DATA                                                        BLK0010
C***COEFFICIENTS GENERATED WITH URBAN SIGMAS USING BRSYSZ & BRSZ         BLK0020
C***DISTANCE OF MAX. CONC. FROM PT SOURCE=PXCOF(KST,IH)*H**PXEXP(KST,IH) BLK0030
C***RELATIVE CONC. NORMALIZED FOR WIND SPEED FROM PT SOURCE, CHI*U/Q, =  BLK0040
C***      PXUCOF(KST,IH)*H**PXUEXP(KST,IH)                             BLK0050
C***DISTANCE OF MAX. CONC. FROM DOWNWIND EDGE OF AREA SOURCE =           BLK0060
C***      AXCOF(KST,IH)*H**AXEXP(KST,IH)                               BLK0070
C***    IH=1 FOR H LESS THAN 20 METERS.                                 BLK0080
C***    IH=2 FOR H FROM 20 TO 30 METERS.                                BLK0090
C***    IH=3 FOR H FROM 30 TO 50 METERS.                                BLK0100
C***    IH=4 FOR H FROM 50 TO 70 METERS.                                BLK0110
C***    IH=5 FOR H FROM 70 TO 100 METERS.                               BLK0120
C***    IH=6 FOR H FROM 100 TO 200 METERS.                              BLK0130
C***    IH=7 FOR H FROM 200 TO 300 METERS.                              BLK0140
C***    IH=8 FOR H FROM 300 TO 500 METERS.                              BLK0150
C***    IH=9 FOR H GREATER THAN 500 METERS.                             BLK0160
      COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),    BLK0170
     *AXCOF(6,9),AXEXP(6,9),HC1(10)                                     BLK0180
      DATA   PXCOF/  .29000E-02,  .29000E-02,  .33389E-02,  .49374E-02, BLK0190
     *  .76841E-02,  .76841E-02,  .31586E-02,  .31586E-02,  .34293E-02, BLK0200
     *  .50285E-02,  .65931E-02,  .65931E-02,  .31977E-02,  .31977E-02, BLK0210
     *  .36114E-02,  .45861E-02,  .51435E-02,  .51435E-02,  .34513E-02, BLK0220
     *  .34513E-02,  .34298E-02,  .43860E-02,  .33140E-02,  .33140E-02, BLK0230
     *  .36196E-02,  .36196E-02,  .33575E-02,  .39506E-02,  .19672E-02, BLK0240
     *  .19672E-02,  .41677E-02,  .41677E-02,  .32748E-02,  .32439E-02, BLK0250
     *  .63291E-03,  .63291E-03,  .50465E-02,  .50465E-02,  .31556E-02, BLK0260
     *  .21446E-02,  .19145E-03,  .19145E-03,  .60289E-02,  .60289E-02, BLK0270
     *  .30537E-02,  .12214E-02,  .12483E-03,  .12483E-03,  .77521E-02, BLK0280
     *  .77521E-02,  .29817E-02,  .39130E-03,  .11337E-03,  .11337E-03/ BLK0290
      DATA   PXEXP/  .10000E+01,  .10000E+01,  .10205E+01,  .10141E+01, BLK0300
     *  .10829E+01,  .10829E+01,  .97149E+00,  .97149E+00,  .10116E+01, BLK0310
     *  .10080E+01,  .11340E+01,  .11340E+01,  .96787E+00,  .96787E+00, BLK0320
     *  .99634E+00,  .10350E+01,  .12070E+01,  .12070E+01,  .94836E+00, BLK0330
     *  .94836E+00,  .10095E+01,  .10465E+01,  .13194E+01,  .13194E+01, BLK0340
     *  .93716E+00,  .93716E+00,  .10145E+01,  .10711E+01,  .14421E+01, BLK0350
     *  .14421E+01,  .90654E+00,  .90654E+00,  .10200E+01,  .11139E+01, BLK0360
     *  .16884E+01,  .16884E+01,  .87043E+00,  .87043E+00,  .10270E+01, BLK0370
     *  .11920E+01,  .19141E+01,  .19141E+01,  .83924E+00,  .83924E+00, BLK0380
     *  .10327E+01,  .12907E+01,  .19890E+01,  .19890E+01,  .79879E+00, BLK0390
     *  .79879E+00,  .10365E+01,  .14738E+01,  .20045E+01,  .20045E+01/ BLK0400
      DATA  PXUCOF/  .16808E+00,  .16808E+00,  .20927E+00,  .20378E+00, BLK0410
     *  .18861E+00,  .18861E+00,  .15945E+00,  .15945E+00,  .20527E+00, BLK0420
     *  .20229E+00,  .21253E+00,  .21253E+00,  .14777E+00,  .14777E+00, BLK0430
     *  .19871E+00,  .20011E+00,  .24888E+00,  .24888E+00,  .13262E+00, BLK0440
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*  .13262E+00,  .18908E+00,  .19685E+00,  .30041E+00,  .30041E+00,  BLK0450
*  .11745E+00,  .11745E+00,  .17767E+00,  .19301E+00,  .34521E+00,  BLK0460
*  .34521E+00,  .91943E-01,  .91943E-01,  .15327E+00,  .18499E+00,  BLK0470
*  .34368E+00,  .34368E+00,  .65533E-01,  .65533E-01,  .11984E+00,  BLK0480
*  .17445E+00,  .23640E+00,  .23640E+00,  .47345E-01,  .47345E-01,  BLK0490
*  .89821E-01,  .15720E+00,  .15537E+00,  .15537E+00,  .29993E-01,  BLK0500
*  .29993E-01,  .56100E-01,  .16747E+00,  .11009E+00,  .11009E+00/  BLK0510
 DATA  PXUEXP/ -.19722E+01, -.19722E+01, -.19896E+01, -.19965E+01,  BLK0520
* -.20649E+01, -.20649E+01, -.19546E+01, -.19546E+01, -.19831E+01,  BLK0530
* -.19940E+01, -.21047E+01, -.21047E+01, -.19322E+01, -.19322E+01,  BLK0540
* -.19736E+01, -.19908E+01, -.21512E+01, -.21512E+01, -.19045E+01,  BLK0550
* -.19045E+01, -.19609E+01, -.19867E+01, -.21993E+01, -.21993E+01,  BLK0560
* -.18759E+01, -.18759E+01, -.19462E+01, -.19820E+01, -.22320E+01,  BLK0570
* -.22320E+01, -.18228E+01, -.18228E+01, -.19142E+01, -.19728E+01,  BLK0580
* -.22310E+01, -.22310E+01, -.17589E+01, -.17589E+01, -.18677E+01,  BLK0590
* -.19617E+01, -.21604E+01, -.21604E+01, -.17019E+01, -.17019E+01,  BLK0600
* -.18172E+01, -.19543E+01, -.20868E+01, -.20868E+01, -.16284E+01,  BLK0610
* -.16284E+01, -.17414E+01, -.19545E+01, -.20314E+01, -.20314E+01/  BLK0620
 DATA  AXCOF/  .44505E-02,  .44505E-02,  .50000E-02,  .58776E-02,  BLK0630
*  .10026E-01,  .10026E-01,  .45289E-02,  .45289E-02,  .50000E-02,  BLK0640
*  .68258E-02,  .76276E-02,  .76276E-02,  .47786E-02,  .47786E-02,  BLK0650
*  .50000E-02,  .63099E-02,  .51380E-02,  .51380E-02,  .52938E-02,  BLK0660
*  .52938E-02,  .50000E-02,  .59067E-02,  .29303E-02,  .29303E-02,  BLK0670
*  .57593E-02,  .57593E-02,  .50000E-02,  .52626E-02,  .16389E-02,  BLK0680
*  .16389E-02,  .68765E-02,  .68765E-02,  .50000E-02,  .39429E-02,  BLK0690
*  .74769E-03,  .74769E-03,  .82988E-02,  .82988E-02,  .50000E-02,  BLK0700
*  .22800E-02,  .39161E-03,  .39161E-03,  .99556E-02,  .99556E-02,  BLK0710
*  .50000E-02,  .10882E-02,  .29900E-03,  .29900E-03,  .12206E-01,  BLK0720
*  .12206E-01,  .50000E-02,  .28165E-03,  .25538E-03,  .25538E-03/  BLK0730
 DATA  AXEXP/  .96437E+00,  .96437E+00,  .10000E+01,  .10199E+01,  BLK0740
*  .11356E+01,  .11356E+01,  .95855E+00,  .95855E+00,  .10000E+01,  BLK0750
*  .10224E+01,  .12269E+01,  .12269E+01,  .94276E+00,  .94276E+00,  BLK0760
*  .10000E+01,  .10455E+01,  .13430E+01,  .13430E+01,  .91659E+00,  BLK0770
*  .91659E+00,  .10000E+01,  .10624E+01,  .14866E+01,  .14866E+01,  BLK0780
*  .89676E+00,  .89676E+00,  .10000E+01,  .10896E+01,  .16163E+01,  BLK0790
*  .16163E+01,  .85826E+00,  .85826E+00,  .10000E+01,  .11523E+01,  BLK0800
*  .17932E+01,  .17932E+01,  .82277E+00,  .82277E+00,  .10000E+01,  BLK0810
*  .12557E+01,  .19153E+01,  .19153E+01,  .79036E+00,  .79036E+00,  BLK0820
*  .10000E+01,  .13853E+01,  .19626E+01,  .19626E+01,  .75807E+00,  BLK0830
*  .75807E+00,  .10000E+01,  .16028E+01,  .19880E+01,  .19880E+01/  BLK0840
DATA HC1/10.,20.,30.,50.,70.,100.,200.,300.,500.,1000./             BLK0850
END                                                                 BLK0860
```

DESCRIPTION OF PARTIAL CONCENTRATION FILE

PARTC

PARTC IS AN EXAMPLE PROGRAM WHICH READS THE PARTIAL CONCENTRATION FILE PRODUCED BY RAM OR RAMR. IT IS GIVEN HERE ONLY AS AN EXAMPLE OF HOW THE PARTIAL CONCENTRATION FILE CAN BE READ.

*

*

*****PROGRAM LISTING*****

```
*
*
C***PROGRAM TO READ PARTIAL CONCENTRATION FILE PRODUCED BY RAM OR RAMR
      DIMENSION PARTC(250),IDATE(2),RREC(150),SREC(150)
C***READ NO. OF HOURS IN AVERAGING TIME AND NO. OF PERIODS TO OUTPUT
      READ(5,10) NAVG,NPER
10    FORMAT()
      DO 50 ND=1,NPER
C***READ HEADER RECORD
      READ(10,END=99) NRECEP,NAS,NPT,(RREC(I),I=1,NRECEP),
     *(SREC(I),I=1,NRECEP)
      WRITE(6,100) NRECEP,NAS,NPT,(I,RREC(I),SREC(I),I=1,NRECEP)
100   FORMAT('1NO. OF RECEPTORS = ',I3,' NO. OF AREA SOURCES = ',
     *I3,' NO. OF POINT SOURCES= ',I3//1X,'RECEPTOR LOCATIONS'/1X,
     *150(I2,2F10.2/1X))
      DO 40 IK=1,NAVG
C***READ POINT CONTRIBUTIONS
      WRITE(6,112)
112   FORMAT(' POINT SOURCE CONTRIBUTIONS(MICROGRAMS/M**3)')
      DO 30 JK=1,NRECEP
      READ(10) IDATE,LH,K,(PARTC(J),J=1,NPT)
      WRITE(6,110) IDATE,LH,K,(PARTC(J),J=1,NPT)
30    CONTINUE
C***READ AREA CONCENTRATIONS
      WRITE(6,111)
111   FORMAT(' AREA SOURCE CONTRIBUTIONS(MICROGRAMS/M**3)')
      DO 20 JK=1,NRECEP
      READ(10) IDATE,LH,K,(PARTC(J),J=1,NAS)
      WRITE(6,110) IDATE,LH,K,(PARTC(J),J=1,NAS)
110   FORMAT(1X,'YEAR= 19',I2,' JULIAN DAY= ',I3,' HOUR= ',I2,
     *' RECEPTOR NO.= ',I3/1X,250(6P10F10.2/1X))
20    CONTINUE
40    CONTINUE
50    CONTINUE
99    CALL EXIT
      END


         INPUT TO PARTC
*
CARD 1 (FREE FORMAT) NAVG,NPER
   NAVG IS THE NUMBER OF HOURS IN THE AVERAGING TIME.
   NPER IS  THE NUMBER OF PERIODS TO READ.
 EXAMPLE:
24,2
*
*
*****  EXAMPLE RUN STREAM  *****
*
*
@RUN,D/R JOBNAME,ACCNT-NO/USERID,PROJ-ID,1,10
@PASSWD PASSWORD
@ASG,A PARTC.
@ASG,T/E PARTCOL.,15N,REEL-NO
@USE  10,PARTCOL
@RQT PARTC.CO
24,2
*
*
FORMAT DESCRIPTION OF PARTIAL CONCENTRATION FILE
*
*
```

EACH RECORD IS UNFORMATTED AND FORTRAN WRITTEN.
THE HEADER RECORD IS WRITTEN AT THE BEGINNING OF EACH PERIOD.
THEN FOR EACH HOUR IN THE PERIOD 'NRECEP' POINT SOURCE RECORDS ARE
WRITTEN FOLLOWED BY 'NRECEP' AREA RECORDS.

HEADER RECORD AT START OF EACH PERIOD

VARIABLE	DESCRIPTION
NRECEP	NUMBER OF RECEPTORS FOR THIS HOUR
NAS	NUMBER OF AREA SOURCES
NPT	NUMBER OF POINT SOURCES
RREC(I),I=1,NRECEP	EAST COORDINATE OF ALL RECEPTORS(USER UNITS)
SREC(I),I=1,NRECEP	NORTH COORDINATE OF ALL RECEPTORS(USER UNITS)

FOR EACH HOUR IN THE PERIOD THE FOLLOWING RECORDS ARE WRITTEN:

POINT SOURCE CONCENTRATION RECORDS(1 FOR EACH RECEPTOR)

VARIABLE	DESCRIPTION
IDATE(1)	2-DIGIT YEAR
IDATE(2)	JULIAN DAY
LH	HOUR
K	RECEPTOR NUMBER
PARTC(J),J=1,NPT	THE CONTRIBUTION(MICROGRAMS/M**3) FROM POINT SOURCE J TO RECEPTOR K

AREA CONCENTRATION RECORDS(1 FOR EACH RECEPTOR)

VARIABLE	DESCRIPTION
IDATE(1)	2-DIGIT YEAR
IDATE(2)	JULIAN DAY
LH	HOUR
K	RECEPTOR NUMBER
PARTC(J),J=1,NAS	THE CONTRIBUTION(MICROGRAMS/M**3) FROM AREA SOURCE J TO RECEPTOR K

EXAMPLE PUNCHCARD OUTPUT FROM RAM

PUNCHCARD
PUNCHCARD CONTAINS THE FORMAT OF THE PUNCH CARD OUTPUT FROM RAM OR RAMR.

COLUMN	FORMAT	DESCRIPTION
1-4	A4	'CNTL'
6-15	F10.3	EAST RECEPTOR COORDINATE(USER UNITS)
16-25	F10.3	NORTH RECEPTOR COORDINATE(USER UNITS)

26-35	F10.3	TOTAL CONCENTRATION(MICROGRAMS/M**3)
36-45	F10.3	TOTAL CONC. FROM AREA SOURCES(MICROGRAMS/M**3)
46-55	F10.3	TOTAL CONC. FROM POINT SOURCES(MICROGRAMS/M**3)
56-59	I4	RECEPTOR NUMBER

C***EXAMPLE OUTPUT FROM RAM TEST RUN

CNTL	566.000	4405.000	11.425	.275	11.150	1
CNTL	564.000	4401.500	1.379	.699	.680	2
CNTL	563.563	4406.558	3.362	.000	3.362	3
CNTL	562.427	4405.615	1.795	.000	1.795	4
CNTL	579.229	4403.025	61.939	3.012	58.926	5
CNTL	578.957	4402.800	19.872	3.290	16.581	6
CNTL	577.070	4401.035	44.640	7.869	36.771	7
CNTL	576.690	4400.720	19.401	8.482	10.919	8
CNTL	576.395	4400.406	80.632	9.043	71.589	9
CNTL	576.040	4400.112	32.471	9.333	23.138	10
CNTL	582.702	4400.653	31.675	.010	31.665	11
CNTL	582.404	4400.406	8.834	.015	8.819	12
CNTL	577.896	4400.085	8.321	8.255	.066	13
CNTL	575.919	4400.104	26.434	9.138	17.295	14
CNTL	577.934	4402.117	5.153	3.833	1.320	15
CNTL	577.919	4406.104	53.255	3.550	49.705	16
CNTL	573.934	4400.117	26.366	6.250	20.116	17
CNTL	579.856	4406.052	2.565	2.565	.000	18
CNTL	573.934	4406.117	7.658	2.724	4.934	19
CNTL	569.896	4404.256	1.924	1.860	.064	20
CNTL	581.856	4404.052	1.382	1.382	.000	21
CNTL	579.856	4404.052	1.637	1.637	.000	22
CNTL	572.000	4400.866	10.433	1.356	9.077	23
CNTL	580.000	4400.866	.417	.417	.000	24
CNTL	571.000	4402.598	25.163	1.331	23.832	25
CNTL	573.000	4402.598	20.314	.645	19.669	26
CNTL	575.000	4402.598	5.293	.724	4.569	27
CNTL	577.000	4402.598	5.082	2.215	2.867	28
CNTL	572.000	4404.330	8.692	1.718	6.974	29
CNTL	574.000	4404.330	51.828	1.138	50.690	30
CNTL	576.000	4404.330	1.281	.876	.404	31
CNTL	578.000	4404.330	6.786	.809	5.977	32
CNTL	571.000	4406.062	1.575	1.560	.015	33
CNTL	575.000	4406.062	18.158	2.550	15.608	34
CNTL	572.000	4407.794	10.620	.337	10.282	35
CNTL	574.000	4407.794	1.169	1.148	.021	36
CNTL	576.000	4407.794	13.959	.000	13.959	37
CNTL	578.000	4407.794	1.416	1.281	.135	38
CNTL	580.000	4407.794	.640	.640	.000	39

6. RAMF - INPUT FORMATS AND EXAMPLE RUNSTEAMS

```
RAMFDOC

C***RAMF IS THE LONG TERM VERSION OF RAM,
C***AN EFFICIENT GAUSSIAN-PLUME MULTIPLE-SOURCE
C***AIR QUALITY ALGORITHM. RAM IS DESCRIBED IN: NOVAK,J.H., AND
C***TURNER,D.B., 1976: AIR POLLUTION CONTROL ASSOC. J., VOL. 26, NO. 6,
C***PAGES 570-575(JUNE 1976). RAMF'S PRINCIPAL USE IS TO DETERMINE
C***FREQUENCY DISTRIBUTIONS AND LONG TERM(UP TO A YEAR) CONCENTRATIONS FROM
C***POINT AND AREA SOURCES IN URBAN AREAS BY CALCULATING AND AVERAGING 1 HOUR
C***CONCENTRATIONS.

C***THREE SYSTEMS OF LENGTH AND COORDINATES ARE USED IN RAMF:
C*** THE FIRST SYSTEM, USER UNITS, IS SELECTED BY THE USER AND
C***  NORMALLY USES THE COORDINATE SYSTEM OF THE EMISSION INVENTORY.
C***  ALL LOCATIONS INPUT BY THE USER(SUCH AS SOURCES AND RECEPTORS)
C***  ARE IN THIS SYSTEM. ALSO AS A CONVENIENCE TO THE USER ALL
C***  LOCATIONS ON OUTPUT ARE ALSO IN THIS SYSTEM.
C*** THE SECOND SYSTEM, INTERNAL UNITS, IS USED INTERNALLY IN RAMF
C***  FOR COORDINATE LOCATIONS AND DISTANCES. ONE INTERNAL UNIT IS THE
C***  SIDE LENGTH OF THE SMALLEST AREA SOURCE SQUARE. THIS LENGTH MUST
C***  BE IDENTIFIED AND SPECIFIED BY THE USER. THE PURPOSE OF USING
C***  INTERNAL UNITS IS TO HAVE A CORRESPONDENCE BETWEEN LOCATION(GRID
C***  COORDINATES) AND PARTICULAR AREA SOURCE POSITIONS. THIS IS
C***  ACCOMPLISHED THROUGH THE USE OF THE AREA SOURCE MAP ARRAY(IA ARRAY
C***  ). THIS ALLOWS DETERMINATION AS TO WITHIN WHICH AREA SOURCE ANY
C***  COORDINATE POINT RESIDES.
C*** THE THIRD SYSTEM,X,Y, IS AN UPWIND, CROSSWIND COORDINATE SYSTEM
C***  WITH REFERENCE TO EACH RECEPTOR. THE X-AXIS IS DIRECTED UPWIND
C***  (SAME AS WIND DIRECTION FOR THE PERIOD). IN ORDER TO DETERMINE
C***  DISPERSION PARAMETER VALUES AND EVALUATE EQUATIONS FOR
C***  CONCENTRATIONS, DISTANCES IN THIS SYSTEM MUST BE IN KILOMETERS.
C***

         CARD INPUT TO RAMF (OR RAMFR)

CARD 1 (13A6,A2)   LINE1      80 CHARACTER TITLE
 EXAMPLE:
 RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV, EPA(1 JAN 78)


CARD 2 (13A6,A2)   LINE2      80 ALPHA CHARACTERS OF INFORMATION
 EXAMPLE:
 EMISSIONS: TEST CITY, 1973


CARD 3 (13A6,A2)   LINE3      80 ALPHA CHARACTERS OF INFORMATION
 EXAMPLE:
 SFC MET DATA: TEST CITY,1973; UPPER AIR: TEST CITY, 1973


CARD 4 (FREE FORMAT) IOPT,NPER,NAVG,Z,HAFL,NSIGP,NSIGA,IDATE,IHSTRT
  IOPT - OPTIONS (THIRTEEN DIFFERENT ONES) CODED: 1= USE OPTION, 0= DON'T USE.
  IOPT(1)  POINT SOURCE INPUT?
```

IOPT(2) AREA SOURCE INPUT?
IOPT(3) ENTERING PERMANENT RECEPTOR COORDINATES?
IOPT(4) NOT AVAILABLE IN THIS VERSION
IOPT(5) NOT AVAILABLE IN THIS VERSION
IOPT(6) NOT AVAILABLE IN THIS VERSION
IOPT(7) NOT AVAILABLE IN THIS VERSION
IOPT(8) NOT AVAILABLE IN THIS VERSION
IOPT(9) NOT AVAILABLE IN THIS VERSION
IOPT(10) NOT AVAILABLE IN THIS VERSION
IOPT(11) INPUT MET DATA ON CARDS?
IOPT(12) SPECIFY SIGNIFICANT SOURCES?
RAMQ INTERNALLY DETERMINES THE ORDER OF SIGNIFICANCE FOR BOTH POINT AND AREA SOURCES. THE USER SHOULD EMPLOY OPTION 12 ONLY IF THERE IS A PARTICULAR SOURCE OF INTEREST WHICH WAS NOT CONSIDERED TO BE SIGNIFICANT BY RAMQ. IF THE USER WISHES TO ADD A SIGNIF. POINT SOURCE BUT NOT A SIGNIFICANT AREA SOURCE, BOTH CARD TYPE 6 AND 9 MUST BE INCLUDED IF BOTH POINT AND AREA SOURCES ARE BEING CONSIDERED AND INAS SHOULD BE SET TO 0.

IOPT(13) READ HOURLY EMISSIONS?
NPER THE NUMBER OF PERIODS TO BE RUN
NAVG THE NUMBER OF HOURS IN THE AVERAGING TIME
IF THE AVERAGING TIME IS 24 HOURS, NPER IS EQUIVALENT TO THE NUMBER OF DAYS TO BE RUN. NAVG=24 IS THE STANDARD RECOMMENDED AVERAGING TIME. IF ANOTHER AVERAGING TIME IS USED 1) THE FINAL TABLE LABELED 'FIVE HIGHEST 24-HOUR CONCENTRATIONS' GENERATED BY RAMF OR RAMFR WILL BE INCORRECT, 2) THE DAILY OUTPUT WILL BE NAVG OUTPUT INSTEAD OF DAILY AND WILL HAVE TO BE READ IN A FORMAT DIFFERENT THAN ILLUSTRATED IN RAMFDAY.
Z RECEPTOR HEIGHT ABOVE GROUND (METERS) (ALL MUST BE AT SAME HEIGHT).
HAFL POLLUTANT HALF-LIFE (SECONDS).
NSIGP NO. OF SIGNIFICANT POINT SOURCES.
NSIGA NO. OF SIGNIFICANT AREA SOURCES.
NOTE:ONLY THOSE SOURCES DESIGNATED AS SIGNIFICANT APPEAR ON THE PRINTOUT
IDATE(1) 2 DIGIT YEAR
IDATE(2) STARTING JULIAN DAY FOR THIS RUN
IHSTRT STARTING HOUR

RESTRICTIONS ON INPUT PARAMETERS FOR RAMF

1) IF METEOROLOGICAL DATA HAS BEEN PREPROCESSED USING RAMMET OR THE CRSTER PREPROCESSOR:
   (A) THE STARTING HOUR(IHSTRT) MUST EQUAL 1.
   (B) DAYS MUST BE RUN IN ORDER STARTING WITH DAY 1,BUT CAN BE BROKEN INTO SEPARATE RUNS IF CONVENIENT. SEE RUNSTREAM EXAMPLES FOR USE.
   (C) IF MULTIPLE DAYS ARE TO BE RUN, THE AVERAGING TIME(NAVG) MAY BE 1,2,3,4,6,8,12, OR 24. FOR OTHER AVERAGING TIMES<=24, THE TOTAL NUMBER OF HOURS RUN(NAVG*NPER) MUST NOT EXCEED 24.
   NAVG MUST BE 24 IF 1)CUMF IS TO BE RUN, 2) IF FINAL TABLES ARE TO BE INTERPRETED CORRECTLY, 3) IF DAILY OUTPUT IS TO BE READ AS SHOWN IN EXAMPLE.
   (D) NON-CONSECUTIVE DAYS OR PERIODS MUST BE RUN SEPARATELY.

2) IF METEOROLOGICAL DATA IS TO BE INPUT ON CARDS:
   (A) THE STARTING HOUR(IHSTRT) MAY RANGE BETWEEN 1 AND 24 INCLUSIVELY.
   (B) THE STARTING JULIAN DAY(IDATE(2)) MUST AGREE WITH THE DATE ON THE FIRST INPUT CARD. NO FILE MANIPULATION IS DONE.
   (C) THE AVERAGING TIME(NAVG) SHOULD BE A MULTIPLE OF 24 IF MULTIPLE CONSECUTIVE DAYS ARE TO BE RUN.
   (D) NON-CONSECUTIVE DAYS OR PERIODS CAN BE PROCESSED IN THE SAME RUN. HOURS WITHIN A PERIOD MUST BE CONSECUTIVE AND EACH PERIOD MUST HAVE THE SAME AVERAGING TIME.

EXAMPLE:
1,1,1,0,0,0,0,0,0,0,0,1,1, 1, 24, 0.0, 14400., 5, 10, 73, 001,1

CARD TYPE 5 (FREE FORMAT) ISFCD,ISFCYR,IMXD,IMXYR
THIS CARD IS REQUIRED ONLY IF IOPT(11)=0

ISFCD — SURFACE METEOROLOGICAL STATION IDENTIFICATION.

ISFCYR — YEAR OF SURFACE DATA - 2 DIGITS.

IMXD — IDENTIFICATION OF RADIOSONDE STATION USED TO DETERMINE MIXING HEIGHT.

IMXYR — YEAR OF MIXING HEIGHT DATA - 2 DIGITS.

EXAMPLE:
93815, 73, 93815, 73

CARD TYPE 6 (2613) INPT,MPS
THIS CARD IS REQUIRED ONLY IF IOPT(1)=1 AND IOPT(12)=1

INPT — THE NUMBER OF USER SPECIFIED SIGNIFICANT POINT SOURCES, COUNT(MAX=25)

MPS — POINT SOURCE NUMBERS USER WANTS TO CONSIDER SIGNIFICANT(I.E., CONC. CONTRIBUTIONS FROM SIGNIF. SOURCES ARE PRINTED ON OUTPUT)

EXAMPLE:
1 7

CARD TYPE 7 (FREE FORMAT) FH,XLIM,NHTS,(HINT(I),I=1,NHTS)
THIS CARD IS REQUIRED ONLY IF IOPT(2)=1

FH — FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGHT

XLIM — DISTANCE LIMIT ON INTEGRATION FOR AREA SOURCE(USER UNITS). IN ORDER FOR CALCULATED CONCENTRATIONS FROM AREA SOURCES TO BE DETERMINED CORRECTLY, XLIM SHOULD BE EQUIVALENT TO THE GREATEST DISTANCE FROM ANY RECEPTOR(INCLUDING THOSE GENERATED BY THE ALGORITHM) TO ANY PART OF AN AREA SOURCE. IF RECEPTORS ARE OUTSIDE THE AREA SOURCE REGION, XLIM WILL BE THE DISTANCE FROM THE RECEPTOR FARTHEST FROM THE AREA SOURCE REGION ACROSS THE AREA SOURCE TO THE CORNER FARTHEST AWAY FROM THE RECEPTOR. IF ALL RECEPTORS ARE INSIDE THE AREA SOURCE REGION, XLIM IS THE GREATEST POSSIBLE DISTANCE FROM A RECEPTOR TO A CORNER OF THE AREA SOURCE REGION. XLIM IS ENTERED IN USER UNITS. IF XLIM IS TOO SHORT THE CALCULATED CONCENTRATION WILL BE TOO LOW. IF XLIM IS TOO LARGE COMPUTATION TIME IS INCREASED. XLIM CANNOT EXCEED 116 KM.

NHTS — NUMBER OF HEIGHTS TO BE USED FOR AREA SOURCES(MIN=1,MAX=3)

HINT — HEIGHT(S) (METERS) FOR AREA SOURCE INTEGRATIONS. THIS IS AN ARRAY OF FROM ONE TO THREE ELEMENTS.

EXAMPLE:
.75, 25., 3, 11.,15.,20.

CARD TYPE 8 (FREE FORMAT) (BPH(I),I=1,NBP)
THIS CARD IS REQUIRED ONLY WHEN CARD TYPE 7 IS USED.

BPH — BREAKPOINT HEIGHTS (METERS) BETWEEN AREA SOURCE HEIGHTS. THESE VALUES DEFINE THE BOUNDS OF HEIGHT CLASSES. ANY AREA SOURCE FALLING WITHIN THE HEIGHT CLASS WILL USE THE SPECIFIED REPRESENTAVIE HEIGHT(HINT) FOR THAT CLASS DURING THE INTEGRATION.
ARRAY OF TWO ELEMENTS. ONE VALUE WILL BE READ IF NHTS ON PREVIOUS CARD IS 1 OR 2. TWO VALUES READ FOR NHTS = 3. BPH AND HINT CAN USUALLY BE CHOSEN BY EXAMINING THE QUANTITY OF AREA SOURCE EMISSIONS WITH HEIGHT WHICH IS GIVEN AS PART OF THE RAMQ OUTPUT. IT IS DESIRABLE TO CHOOSE AS REPRESENTATIVE HEIGHTS FROM AREA SOURCES AS POSSIBLE. IF NHTS IS 1, THE VALUE OF BPH MUST BE LARGER THAN

```
            ANY AREA HEIGHT IN THE DATA SET FOR THE RUN.
EXAMPLE:
13., 17.


CARD TYPE 9 (2613) INAS,MAS
     THIS CARD IS REQUIRED ONLY IF IOPT(2)=1 AND IOPT(12)=1
 INAS       THE NUMBER OF USER SPECIFIED SIGNIFICANT AREA SOURCES, COUNT(MAX=10)
 MAS        AREA SOURCE NUMBERS USER WANTS TO CONSIDER SIGNIFICANT(I.E. CONC.
             CONTRIBUTIONS FROM SIGNIF. SOURCES ARE PRINTED ON OUTPUT)

EXAMPLE:
  0


CARD TYPE 10  (2A4,1X,2F10.3) (RNAME(J,NRECEP),J=1,2),RREC(NRECEP),SREC(NRECEP)
      ONE CARD FOR EACH RECEPTOR. THESE CARDS ARE REQUIRED FOR RAMF AND RAMFR
      VERSIONS.  LAST RECEPTOR CARD MUST BE BLANK.
  RNAME    ALPHA-NUMERIC STATION IDENTIFIER (8 CHARACTERS).
  RREC     EAST COORDINATE OF RECEPTOR (USER UNITS).
  SREC     NORTH COORDINATE OF RECEPTOR (USER UNITS).
      NOTE THAT THE SUM OF RREC AND SREC EQUAL TO ZERO IS USED TO TRANSFER
       CONTROL SIGNALING THAT THE LAST RECEPTOR CARD HAS BEEN READ.(I.E. A BLANK
       CARD). A COORDINATE SCHEME SHOULD BE SELECTED PRIOR TO RUNNING RAMQ SO
       THAT SOURCES AND RECEPTORS HAVE POSITIVE EAST(R) AND NORTH(S) COORDINATES
 EXAMPLE:
RECEP 1    575.25    4409.0


CARD TYPE 11 (FREE FORMAT) IDAY,LDRUN
   REQUIRED FOR ALL RUNS
 IDAY       NUMBER OF DAYS PREVIOUSLY PROCESSED
 LDRUN      LAST JULIAN DAY NUMBER TO BE PROCESSED(JULIAN DAY OF LAST HOUR
             PROCESSED WHEN START HOUR IS NOT EQUAL TO 1).
EXAMPLE:
0,1


CARD TYPE 12 (FREE FORMAT) JYR,IMO,DAY1,IKST(JHR),QU(JHR),QTEMP(JHR),
          QTHETA(JHR),QHL(JHR)
     THESE CARDS CONTAIN HOURLY SURFACE OBSERVATIONS AND ARE REQUIRED ONLY IF
     IOPT(11)=1. THERE SHOULD BE A CARD FOR EACH HOUR TO BE MODELED.
     IF(IOPT(11)=0 THE MET. DATA IS ASSUMED TO COME FROM RAMMET OUTPUT.
  JYR           YEAR OF MET. DATA
  DAY1          JULIAN DAY OF MET. DATA
  JHR           HOUR OF MET. DATA
  IKST(JHR)     STABILITY CLASS FOR THE JHR-TH HOUR
  QU(JHR)       WIND SPEED(M/SEC) FOR THE JHR-TH HOUR
  QTEMP(JHR)    AMBIENT AIR TEMPERATURE(DEG-KELVIN) FOR THE JHR-TH HOUR
  QTHETA(JHR)   WIND DIRECTION(DEG) FOR JHR-TH HOUR(FROM WHICH WIND IS BLOWING)
  QHL(JHR)      MIXING HEIGHT(METERS) FOR THE JHR-TH HOUR
EXAMPLE:
73,1,1,4,6.17,269.82,33.0,429.11



*********POSSIBLE DISK OR TAPE INPUT TO RAMF OR RAMFR*****

1) ANNUAL OR AVERAGE EMISSION DATA IS REQUIRED FOR THE EXECUTION OF RAMF.
THE MODEL EXPECTS THESE EMISSIONS ON UNIT 9 IN THE FORMAT AS OUTPUT FROM THE
EMISSION PREPROCESSOR, RAMQ. SEE RAMQDOC FOR A DESCRIPTION OF THE INPUT DATA
```

FORMAT.

2) HOURLY METEOROLOGICAL DATA CAN BE INPUT VIA CARDS AS DESCRIBED ABOVE, OR CAN BE INPUT FROM DISK/TAPE ON UNIT 11 IN THE FORMAT AS OUTPUT FROM THE MET. PREPROCESSOR RAMMET. THIS OUTPUT FORMAT IS EXACTLY THE SAME AS THE OUTPUT FILE FROM THE MX24SP(ALSO CRSTER) PREPROCESSORS. THE ONLY DIFFERENCE BETWEEN THE RAMMET PREPROCESSOR AND THE CRSTER PREPROCESSOR IS THE GENERATED RANDOM NUMBERS. SEE RAMMETDOC FOR A DESCRIPTION OF THE INPUT DATA FORMAT.

3) HOURLY POINT SOURCE EMISSION DATA CAN BE INPUT FROM DISK OR TAPE ON UNIT 15. RAM EXPECTS EMISSIONS, ONE RECORD FOR EACH HOUR, AS FORTRAN WRITTEN UNFORMATTED RECORDS CONTAINING THE FOLLOWING DATA:

VARIABLE	DESCRIPTION
IDATP	DATE(YYDDDHH) WHERE YY=YEAR,DDD=JULIAN DAY, HH=HOUR
SOURCE(IPOL,I),I=1,NPT	THE HOUR'S POINT SOURCE EMISSIONS(GRAMS/SECOND) FOR EACH OF THE POINT SOURCES IN THE ORDER IN WHICH THEY WERE INPUT INTO RAMQ.(IPOL HERE IS THE POLLUTANT TYPE AS SPECIFIED AS INPUT TO RAMQ, 3=SO2, 4=PARTICULATE)

4) HOURLY AREA SOURCE EMISSION DATA CAN BE INPUT FROM DISK OR TAPE ON UNIT 16. RAM EXPECTS EMISSIONS, ONE RECORD FOR EACH HOUR, AS FORTRAN WRITTEN UNFORMATTED RECORDS CONTAINING THE FOLLOWING DATA:

VARIABLE	DESCRIPTION
IDATA	DATE(YYDDDHH) WHERE YY=YEAR,DDD=JULIAN DAY, HH=HOUR
ASORC(IPOL,I),I=1,NAS	THE HOUR'S AREA EMISSIONS(GRAMS/SECOND) FOR EACH OF THE AREA SOURCES IN THE ORDER IN WHICH THEY WERE INPUT INTO RAMQ.

NOTE: IT IS ASSUMED THAT THE USER WILL SUPPLY HIS OWN SOFTWARE TO PRODUCE THE HOURLY EMISSION FILES COMPATIBLE WITH THIS FORMAT.
C

C**********DISK AND TAPE OUTPUT FROM RAMF OR RAMFR**********

1) HOURLY CONCENTRATIONS(GRAMS/M**3) AT EACH RECEPTOR ARE WRITTEN TO TAPE EACH HOUR OF THE ENTIRE MODELING PERIOD. SEE RAMFHOUR FOR THE FORMAT OF THIS TAPE OUTPUT(UNIT 12).
2) DAILY CONCENTRATIONS(GRAMS/M**3) AT EACH RECEPTOR ARE WRITTEN TO DISK EACH AVERAGING PERIOD OF THE ENTIRE MODELING PERIOD. SEE RAMFDAY FOR THE FORMAT OF THIS DISK OUTPUT(UNIT 13).
3) A RUNNING SUM OF THE CONCENTRATION AT EACH RECEPTOR IS KEPT AND IF A LONG RUN IS BROKEN INTO MULTIPLE RUNS, THE CURRENT CONCENTRATION SUMS AREA WRITTEN TO DISK(UNIT 14).

C*****DESCRIPTION OF FINAL OUTPUT TABLES IN RAMF AND RAMFR*****

TWO SUMMARY TABLES ARE PRINTED AT THE END OF EACH RUN OR SEQUENCE OF RUNS OF RAMF AND RAMFR. THE FIRST TABLE CONTAINS THE FIVE HIGHEST 24-HOUR CONCENTRATIONS(MICROGRAMS/M**3) FOR EACH RECEPTOR FOR THE ENTIRE PERIOD MODELED, , AND IN PARENTHESIS THE JULIAN DAY ON WHICH THESE CONCENTRATIONS OCCURRED. THE FINAL COLUMN IN THE TABLE CONTAINS THE MEAN CONCENTRATION FOR THE TOTAL NUMBER OF DAYS BEING ANALYSED, EVEN IF THEY ARE RUN AS SEPARATE JOBS. TECHNICALLY THE SUMMARY TABLES ARE ONLY PRINTED IF LDRUN- THE DAY NUMBER OF THE LAST DAY TO BE PROCESSED DURING THIS SEQUENCE OF RUNS- IS EQUAL TO NDAYS - THE TOTAL NUMBER OF DAYS TO BE RUN. (SEE EXAMPLE 3 OF RUN STREAMS FOR RAMF).

```
     THE SECOND TABLE CONTAINS THE FIVE HIGHEST 1-HOUR CONCENTRATIONS AT EACH
RECEPTOR, AND THE JULIAN DAY AND HOUR ON WHICH THESE CONCENTRATIONS OCCURRED.
C
C
C*******************************************************************************
C
ECLSTREAM:  EXAMPLE 1.

     THE FOLLOWING ECL IS NEEDED TO EXECUTE RAMF FOR ONE 24-HOUR PERIOD USING
THE URBAN SIGMAS.  THE PREPROCESSED EMISSION FILE, REFERRED TO AS
RAMQOUT IN THE EXAMPLE , MUST CONTAIN THE PREPROCESSOR
OUTPUT FROM RAMQ WHICH SPECIFIED THE USE OF URBAN SIGMAS.
     THE METEOROLOGICAL DATA CAN BE INPUT EITHER FROM DISK OR CARDS.
THE EXAMPLE ECL DEMONSTRATES MET DATA INPUT FROM THE DISK FILE,METDATA, CREATED
BY THE MET. PREPROCESSOR, RAMMET.
     THE HOURLY EMISSION DATA CAN BE INPUT FROM DISK OR TAPE FILES.
THE EXAMPLE ECL DEMONSTRATES HOURLY EMISSIONS INPUT FROM DISK FILES, RAMHPOINT
AND RAMHAREA.
     TO FACILITATE CHECKING TEST RUNS AGAINST EXAMPLE OUTPUTS GIVEN IN THE
USERS GUIDE, THE HOURLY EMISSIONS DATA USED WITH THIS TEST RUN WAS
THE SAME AS THE AVERAGE EMISSION RATE(INPUT TO RAMQ) FOR EACH HOUR.

*****EXAMPLE ECL STREAM*****

@RUN,D/R JOBNAME/41,ACCNT-NO/USERID,PROJ-ID,1,50/60
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                  . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16N,REEL-NO.                    . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                  .  MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,CP RAM24.                                   . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,CP ANSUM.                                   . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@ASG,A RAMHPOINT.                                . HOURLY POINT EMISSIONS DATA
@USE 15,RAMHPOINT.
@ASG,A RAMHAREA.                                 . HOURLY AREA EMISSIONS DATA
@USE 16,RAMHAREA
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,1, 1, 24, 0.0, 14400., 5, 10, 73, 001,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

0,1
C
C*******************************************************************************
C
C  THE PRECEEDING RUN STREAM HAD A RUN TIME OF 16.61 SECONDS
```

```
C  ON THE UNIVAC 1110 AND REQUIRED 41-K WORDS OF MEMORY
C  (APPROXIMATELY 10,446 WORDS FOR INSTRUCTIONS AND 29,721 WORDS FOR DATA)
C*************************************************************************


ECLSTREAM:  EXAMPLE 2.

THE FOLLOWING ECL IS NEEDED TO EXECUTE RAMF FOR AN ENTIRE YEAR USING THE
URBAN SIGMAS. ANNUAL EMISSIONS ARE USED. FILE DESCRIPTIONS ARE SAME AS ABOVE.

*****EXAMPLE ECL STREAM*****

@RUN,D/R JOBNAME/41,ACCNT-NO/USERID,PROJ-ID,30,2000
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                  . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16H,REEL-NO.                    . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                  .  MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,CP RAM24.                                   . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,CP ANSUM.                                   . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 001,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

0,365
C
C
C*************************************************************************************
C
C
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 29 MINUTES AND 5 SECONDS ON THE
UNIVAC 1110 AND REQUIRED 41-K WORDS OF MEMORY


C*************************************************************************************
C
C
ECLSTREAM:  EXAMPLE 3.

THE FOLLOWING  SEQUENCE OF 6 JOB STREAMS  CAN BE USED TO EXECUTE RAMF
FOR AN ENTIRE YEAR USING URBAN SIGMAS. THEY ARE PRESENTED HERE TO ILLUSTRATE
THE FACT THAT RUNS OF RAMF AND RAMFR CAN BE BROKEN DOWN INTO CONSECUTIVE JOBS
OF MORE CONVENIENT PROCESSING TIMES. ALL FILE MANIPULATION OF TAPE
AND DISKS ARE DONE INTERNALLY . ESPECIALLY NOTE THE USE OF THE
INPUT VARIABLES IDATE(2),NDAYS,IDAY, AND LDRUN.
```

```
*****EXAMPLE ECL STREAMS*****

@RUN,D/R RMF1/41,ACCNT-NO/USERID,PROJ-ID,10,400
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                    . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16N,REEL-NO.                      . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                    .  MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,CP RAM24.                                     . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,CP ANSUM.                                     . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 001,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

0,57
@START RAMTEST.RMF2


C*****************************************************************************
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 4 MINUTES AND 48 SECONDS
ON THE UNIVAC 1110 AND REQUIRED 41K WORDS OF MEMORY .
C*****************************************************************************


@RUN,D/R RMF2/41,ACCNT-NO/USERID,PROJ-ID,10,400
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                    . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16N,REEL-NO.                      . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                    . MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,A  RAM24.                                     . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,A  ANSUM.                                     . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 058,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
```

```
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

57,114
@START RAMTEST.RMF3


C*****************************************************************************************
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 5 MINUTES AND 5 SECONDS
ON THE UNIVAC 1110 AND REQUIRED 41K WORDS OF MEMORY .
C*****************************************************************************************


@RUN,D/R RMF3/41,ACCNT-NO/USERID,PROJ-ID,10,400
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                  . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16N,REEL-NO.                    . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                  . MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,A  RAM24.                                   . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,A  ANSUM.                                   . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS WATER. DIV., REGION IV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 115,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

114,169
@START RAMTEST.RMF4


C*****************************************************************************************
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 5 MINUTES AND 0 SECONDS
ON THE UNIVAC 1110 AND REQUIRED 41K WORDS OF MEMORY .
C*****************************************************************************************


@RUN,D/R RMF4/41,ACCNT-NO/USERID,PROJ-ID,10,400
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                  . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
```

```
@ASG,T/W RAMHOUR,16N,REEL-NO.                    . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                  . MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,A  RAM24.                                   . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,A  ANSUM.                                   . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 170,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

169,224
@START RAMTEST.RMF5


C*****************************************************************************
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 4 MINUTES AND 5 SECONDS
ON THE UNIVAC 1110 AND REQUIRED 41K WORDS OF MEMORY .
C*****************************************************************************


@RUN,D/R RMF5/41,ACCNT-NO/USERID,PROJ-ID,10,400
@PASSWD PASSWORD
@ASG,A RAMQOUT.                                  . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16N,REEL-NO.                    . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                                  . MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,A  RAM24.                                   . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,A  ANSUM.                                   . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@XQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 225,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
```

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RECEP 6    579.53    4403.16

224,274
@START RAMTEST.RMF6


C*****************************************************************************
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 4 MINUTES AND 53 SECONDS
ON THE UNIVAC 1110 AND REQUIRED 41K WORDS OF MEMORY .
C*****************************************************************************


@RUN,D/R RMF6/41,ACCNT-NO/USERID,PROJ-ID,10,400
@PASSWD PASSWORD
@ASG,A RAMQOUT.                          . EMISSION FILE FROM RAMQ
@USE 9,RAMQOUT.
@ASG,T/W RAMHOUR,16N,REEL-NO.            . HOURLY CONCENTRATION OUTPUT TAPE
@USE 12,RAMHOUR.
@ASG,A METDATA.                          . MET. DATA FILE FROM RAMMET
@USE 11,METDATA.
@ASG,A  RAM24.                           . DAILY CONCENTRATION OUTPUT FILE
@USE 13,RAM24.
@ASG,A  ANSUM.                           . STORAGE OF INTERMEDIATE ANNUAL SUMS
@USE 14,ANSUM.
@RQT A999*UNAMAP.RAMF
RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973
1,1,1,0,0,0,0,0,0,0,0,1,0, 365, 24, 0.0, 14400., 5, 10, 73, 275,1
93815,73,93815,73
  1  7
 .75, 25., 3, 11.,15.,20.
13., 17.
  0  0
RECEP 1    575.25    4409.0
RECEP 2    576.0     4404.0
RECEP 3    579.53    4403.1
RECEP 4    576.79    4400.56
RECEP 5    577.29    4399.95
RECEP 6    579.53    4403.16

274,365


C*****************************************************************************
THE PRECEEDING RUN STREAM HAD A RUN TIME OF 8 MINUTES AND 49 SECONDS
ON THE UNIVAC 1110 AND REQUIRED 41K WORDS OF MEMORY .
C*****************************************************************************
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                                    ************************************
                                    *                                  *
                                    *    EXAMPLE PRINTOUT FROM RAMF    *
                                    *                                  *
                                    ************************************

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY,  1973
SFC MET. DATA: TEST CITY 1973 ;  UPPER AIR: TEST CITY 1973

THIS IS THE NORMAL URBAN VERSION(78124) OF RAMF FOR APPLICATION TO ONE OR SEVERAL DAYS DATA.

 OPTION        OPTION LIST                        OPTION SPECIFICATION : 0= IGNORE OPTION
                                                                          1= USE OPTION
      1        POINT SOURCE DATA                    1
      2        AREA SOURCE DATA                     1
      3        PERMANENT RECEPTORS                  1
      4        SIGNIFICANT POINT RECEPTORS          0
      5        SIGNIFICANT AREA RECEPTORS           0
      6        HONEYCOMB RECEPTORS                  0
      7        HOURLY OUTPUT                        0
      8        PARTIAL CONC. WRITTEN TO DISK/TAPE   0
      9        PRINT ONLY SUMMARY HOURLY OUTPUT     0
     10        PUNCH CARDS FOR CONTOURS             0
     11        READ MET DATA FROM CARDS             0
     12        SPECIFY SIGNIFICANT SOURCE NUMBERS   1
     13        READ HOURLY EMISSIONS                1

                  GENERAL INFORMATION FROM RAMQ

UNITS - THERE ARE      2.0000000 USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH (INTERNAL UNIT)
CONONE - THERE ARE      1.6093440 KILOMETERS PER USER UNIT
CONTWO - IT IS CALCULATED THAT THERE ARE      3.2186880 KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH (INTERNAL UNIT)
THIS RUN IS FOR  SO2  SINCE IPOL= 3


                  GENERAL INPUT DATA

NUMBER OF PERIODS TO BE SIMULATED(NPER)=    1
AVERAGING TIME IN HOURS FOR EACH PERIOD(NAVG)=     24
STARTING DATE(IDATE(2),IDATE(1),IHSTRT): JULIAN DAY     1, YEAR 1973 HOUR=  1
RECEPTOR HEIGHT FOR ALL RECEPTORS(Z)    .000 METERS
ASSUMED POLLUTANT HALF-LIFE(HAFL)    14400.00 SECONDS
SURFACE MET DATA FROM STATION(ISFCD)  93815, YEAR(ISFCYR) 1973
MIXING HEIGHT DAT   ROM STATION(IMXD)  93815, YEAR(IMXYR) 1973
```

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

POINT SOURCE INFORMATION

EMISSION INFORMATION FOR 12 (NPT) POINT SOURCES HAS BEEN DETERMINED BY RAMQ
5 SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN
THE ORDER OF SIGNIFICANCE(IMPS) FOR 25 OR LESS POINT SOURCES DETERMINED BY RAMQ IS LISTED BY POINT SOURCE NUMBER:
5 8 9 11 3

POINT SOURCE LISTING

SOURCE	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)	SO2(G/SEC) EMISSIONS	PART(G/SEC) EMISSIONS	STACK HT(M)	STACK TEMP(K)	STACK DIAM(M)	STACK VEL(M/SEC)
1 PLANT 1	579.50	4406.75	232.36	13.34	82.90	513.10	3.50	13.70
2 PLANT 2	575.25	4405.25	150.47	57.01	76.20	464.30	3.20	12.50
3 PLANT 3	571.25	4407.00	19.01	3.25	25.90	477.60	1.00	15.80
4 PLANT 4	571.75	4402.25	81.06	28.35	40.80	499.80	2.90	17.60
5 PLANT 5	579.50	4403.25	26.14	5.14	15.30	533.20	.60	14.70
6 PLANT 6	567.14	4400.89	2.56	.00	26.50	505.00	1.04	3.81
7 PLANT 7	564.70	4407.50	76.43	.00	48.80	464.00	3.05	18.60
8 PLANT 8	577.45	4401.35	33.64	.00	26.50	428.00	1.68	5.02
9 PLANT 9	576.75	4400.70	78.80	.00	6.00	654.00	.79	24.89
10 PLANT 10	580.10	4412.00	299.50	.00	93.00	405.00	4.88	12.59
11 PLANT 11	583.00	4400.90	16.74	.00	18.10	506.00	1.37	4.23
12 PLANT 12	574.00	4398.00	226.20	.00	93.60	483.00	4.88	12.59

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

AREA SOURCE INFORMATION

EMISSION INFORMATION FOR 15 (NAS) AREA SOURCES HAS BEEN DETERMINED BY RAMQ
10 SIGNIFICANT AREA SOURCES(NSIGA) ARE TO BE USED FOR THIS RUN
THE ORDER OF SIGNIFICANCE(IMAS) FOR 10 OR LESS AREA SOURCES DETERMINED BY RAMQ IS LISTED BY AREA SOURCE NUMBER:
4 3 5 9 2 10 8 7 13 12
NUMBER OF AREA HEIGHT CLASSES(NHTS)= 3
REPRESENTATIVE AREA SOURCE HEIGHTS FOR EACH HEIGHT CLASS(HINT) IN METERS= 11.00 15.00 20.00
BREAK POINT HEIGHT BETWEEN THE AREA HEIGHT CLASSES(BPH) IN METERS= 13.00 17.00
FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGHT(FH)= .750
LIMIT OF DISTANCE FOR AREA SOURCE INTEGRATION TABLES(XLIM) IN USER UNITS = 25.000
BOUNDARIES OF THE AREA SOURCE GRID IN USER UNITS:
RMIN= 570.000 RMAX= 584.000 SMIN= 4400.000 SMAX= 4408.000
SIZE(IRSIZE X ISSIZE) OF AREA SOURCE MAP ARRAY(IA) IN INTERNAL UNITS = 7 EAST-WEST BY 4 NORTH-SOUTH

AREA SOURCE MAP ARRAY(IA)

4	7	7	8	0	9	10	11
3	7	7	6	6	0	12	13
2	1	1	6	6	5	14	15
1	1	1	2	3	4	0	0
	1	2	3	4	5	6	7

AREA SOURCE LISTING

SOURCE	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)	SO2(G/SEC-M**2) EMISSIONS	PART(G/SEC-M**2) EMISSIONS	SIDE LENGTH (USER UNITS)	EFFECTIVE HEIGHT (M)
1	570.0	4400.0	3.0164-06	0.0000	4.0	10.0
2	574.0	4400.0	2.9440-07	0.0000	2.0	10.0
3	576.0	4400.0	6.0328-07	0.0000	2.0	12.0
4	578.0	4400.0	8.5425-07	0.0000	2.0	15.0
5	578.0	4402.0	3.0406-07	0.0000	2.0	10.0
6	574.0	4402.0	0.0000	0.0000	4.0	.0
7	570.0	4404.0	1.0256-07	0.0000	4.0	15.0
8	574.0	4406.0	2.5097-07	0.0000	2.0	10.0
9	578.0	4406.0	2.9923-07	0.0000	2.0	12.0
10	580.0	4406.0	2.6641-07	0.0000	2.0	20.0
11	582.0	4406.0	8.0116-08	0.0000	2.0	20.0
12	580.0	4404.0	1.6023-07	0.0000	2.0	20.0
13	582.0	4404.0	1.6340-07	0.0000	2.0	20.0
14	580.0	4402.0	4.9228-08	0.0000	2.0	20.0
15	582.0	4402.0	1.4288-07	0.0000	2.0	20.0

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

INPUT RECEPTORS

RECEPTOR	IDENTIFICATION	EAST COORD (USER UNITS)	NORTH COORD
1 1	RECEP 1	575.29	4409.00
2 1	RECEP 2	576.00	4404.00
3 1	RECEP 3	579.53	4403.10
4 1	RECEP 4	576.79	4400.56
5 1	RECEP 5	577.29	4399.95
6 1	RECEP 6	579.53	4403.16

THE NUMBER OF PERIODS PREVIOUSLY COMPLETED EQUAL 0 AND THE LAST PERIOD TO BE COMPLETED IN THIS RUN IS 1

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

INPUT MET DATA 731 1

HOUR	THETA (DEG)	SPEED (M/S)	MIXING HEIGHT(M)	TEMP (DEG-K)	STABILITY CLASS
1	66.00	3.09	250.00	266.15	5
2	41.00	5.14	483.93	268.71	4
3	28.00	4.63	456.52	269.26	4
4	33.00	6.17	429.11	269.82	4
5	25.00	4.63	401.70	271.48	4
6	5.00	7.20	374.29	270.37	4
7	357.00	6.17	346.88	267.59	4
8	5.00	8.23	319.47	270.93	4
9	13.00	9.26	292.06	269.82	4
10	12.00	9.26	264.64	268.15	4
11	338.00	9.26	237.23	268.15	4
12	342.00	7.20	209.82	268.15	4
13	338.00	7.20	182.41	268.71	4
14	318.00	5.14	155.00	268.71	4
15	307.00	6.17	155.00	269.82	4
16	276.00	6.69	155.00	269.82	4
17	268.00	4.63	155.00	268.71	4
18	264.00	3.09	180.87	268.15	5
19	218.00	5.14	216.73	266.48	5
20	196.00	6.17	211.34	264.82	4
21	215.00	7.72	232.05	267.04	4
22	209.00	7.72	252.75	268.71	4
23	210.00	7.72	273.45	269.26	4
24	205.00	8.23	294.16	269.26	4

RESULTANT MET CONDITIONS

WIND DIRECTION= 327.22 RESULTANT WIND SPEED= 2.52
AVERAGE WIND SPEED= 6.49 AVERAGE TEMP= 269.75
WIND PERSISTENCE= .388 MODAL STABILITY= 4

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION IV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

24-HOUR AVERAGE SO2 CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT POINT SOURCES 73/ 1 START HOUR: 1

RANK	1	2	3	4	5	TOTAL SIGNIF POINT	TOTAL ALL POINT SOURCES
SOURCE #	7	5	6	9	11		
RECEP #							
1	.229	.000	.000	.000	.000	.728	1.768
2	.001	.000	.001	.000	.000	.701	5.664
3	.000	61.289	.024	.023	.000	61.337	68.904
4	.016	.252	3.224	122.012	.000	125.435	132.805
5	.033	.354	2.652	4.683	.000	7.721	14.779
6	.000	100.460	.047	.037	.000	100.539	108.101

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION IV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
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24-HOUR AVERAGE SO2 CONTRIBUTION(MICROGRAMS/M**3) FROM SIGNIFICANT AREA SOURCES 73/ 1 START HOUR: 1

RANK	1	2	3	4	5	6	7	8	9	10	TOTAL SIGNIF AREA	TOTAL ALL AREA SOURCES
SOURCE #	4	3	5	6	2	10	8	7	13	12		
RECEP #												
1	.000	.000	.000	.000	.000	.000	.099	.071	.000	.000	.170	.196
2	.000	.000	.000	.028	.117	.030	.093	.071	.000	.007	.345	.387
3	.367	.108	1.249	.096	.050	.063	.064	.013	.036	.061	2.054	2.103
4	.254	2.333	.042	.050	.267	.033	.056	.067	.000	.010	3.125	3.189
5	.424	1.464	.042	.031	.100	.040	.067	.055	.003	.020	2.296	2.338
6	.350	.115	1.243	.098	.000	.064	.064	.016	.036	.064	2.050	2.097

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION IV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

24-HOUR AVERAGE SO2 SUMMARY CONCENTRATION TABLE(MICROGRAMS/M**3) 73/ 1 START HOUR: 1

RECEPTOR NO.	EAST	NORTH	TOTAL FROM SIGNIF POINT SOURCES	TOTAL FROM ALL POINT SOURCES	TOTAL FROM SIGNIF AREA SOURCES	TOTAL FROM ALL AREA SOURCES	TOTAL FROM ALL SOURCES	CONCENTRATION RANK
1 1 0	575.05	4439.05	.0062	1.7677	.1702	.1958	1.9635	6
2 1 0	576.00	4404.57	.0005	5.4641	.3452	.7867	9.0508	5
3 1 0	579.53	4402.19	61.3368	68.9045	2.0539	2.1033	71.0077	3
4 1 0	576.79	4400.52	125.4746	132.8047	3.1250	3.1892	135.9939	1
5 1 0	577.29	4399.95	7.7219	14.7788	2.2962	2.3383	17.1171	4
6 1 0	579.53	4402.19	100.5391	108.1006	2.0499	2.0966	110.1972	2

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
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FIVE HIGHEST 24-HOUR CONCENTRATIONS((JULIAN DAY MAX OCCURS)
(MICROGRAMS/M**3)

RECEPTOR NO.	1	2	3	4	5	MEAN CONCENTRATION
1	1.96(1.)	.00(0.)	.00(0.)	.00(0.)	.00(0.)	1.96
2	9.05(1.)	.00(0.)	.00(0.)	.00(0.)	.00(0.)	9.05
3	71.01(1.)	.00(0.)	.00(0.)	.00(0.)	.00(0.)	71.01
4	135.99(1.)	.00(0.)	.00(0.)	.00(0.)	.00(0.)	135.99
5	17.12(1.)	.00(0.)	.00(0.)	.00(0.)	.00(0.)	17.12
6	110.20(1.)	.00(0.)	.00(0.)	.00(0.)	.00(0.)	110.20

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

FIVE HIGHEST 1-HOUR CONCENTRATIONS(JULIAN DAY MAX OCCURS, HOUR)
(MICROGRAMS/M**3)

RECEPTOR NO.	1	2	3	4	5
1	13.22(1.,22.)	10.64(1.,23.)	9.63(1.,24.)	5.48(1.,18.)	2.62(1.,21.)
2	44.50(1.,20.)	40.67(1.,13.)	32.49(1., 3.)	31.61(1., 5.)	24.38(1.,11.)
3	440.23(1., 7.)	412.53(1.,12.)	261.86(1.,13.)	236.79(1.,11.)	140.12(1., 6.)
4	1006.76(1.,12.)	820.14(1.,13.)	753.73(1.,11.)	333.92(1., 7.)	50.82(1., 6.)
5	91.42(1.,14.)	52.80(1.,13.)	45.43(1.,10.)	45.07(1., 9.)	32.91(1.,11.)
6	793.24(1.,12.)	733.53(1.,13.)	663.19(1.,11.)	223.57(1., 7.)	66.05(1., 8.)

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C***   URBAN  BATCH VERSION(78124) OF RAMF                                    RMF0010
C***RAMF IS THE VERSION OF RAM WHICH PRODUCES OUTPUT TO TAPE AND/OR DISK      RMF0020
C***FOR PLOTTING CUMULATIVE FREQUENCY DISTRIBUTIONS FOR A GIVEN YEAR.         RMF0030
C***RAM IS AN EFFICIENT GAUSSIAN-PLUME MULTIPLE-SOURCE                        RMF0040
C***AIR QUALITY ALGORITHM. RAM IS DESCRIBED IN: NOVAK,J.H., AND               RMF0050
C***TURNER,D.B., 1976: AIR POLLUTION CONTROL ASSOC. J., VOL. 26, NO. 6,       RMF0060
C***PAGES 570-575(JUNE 1976). RAM'S PRINCIPAL USE IS TO DETERMINE             RMF0070
C***AREA SOURCES IN URBAN AREAS.                                              RMF0080
C***SEE RAM GLOSSARY FOR DEFINITIONS OF VARIABLES.                            RMF0090
C***                                                                          RMF0100
C***           POINT SOURCE INFORMATION                                       RMF0110
C***                                                                          RMF0120
C***SOURCE(9,#PT SOURCES)       1=EAST CO-ORD(USER UNITS)                     RMF0130
C***                            2=NORTH CO-ORD(USER UNITS)                    RMF0140
C***                            3=SO2 EMISSION RATE(G/SEC)                    RMF0150
C***                            4=PART EMISSION RATE(G/SEC)                   RMF0160
C***                            5=STACK HEIGHT(M)                             RMF0170
C***                            6=STACK T  P(K)                               RMF0180
C***                            7=STACK DIAM(M)                               RMF0190
C***                            8=STACK VELOCITY(M/S)                         RMF0200
C***                            9=PARTIAL CALCULATION OF BUOYANCY             RMF0210
C***PNAME            12 CHARACTER PLANT IDENTIFICATION                        RMF0220
C***           AREA SOURCE INFORMATION                                        RMF0230
C***ASORC(6,#AREA SOURCES)  1=X CO-ORD(USER UNITS), SOUTHWEST CORNER          RMF0240
C***                        2=Y CO-ORD(USER UNITS), SOUTHWEST CORNER          RMF0250
C***                        3=SO2 EMISSION RATE(G/SEC)                        RMF0260
C***                        4=PART EMISSION RATE(G/SEC)                       RMF0270
C***                        5=SIDE LENGTH(USER UNITS)                         RMF0280
C***                        6=STACK HEIGHT(M)                                 RMF0290
      COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),AXCO-     RMF0300
     1F(6,9),AXEXP(6,9),HC1(10)                                               RMF0310
      COMMON /RELC/ CIN(3,200)                                                RMF0320
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR      RMF0330
     1EC(150),SREC(150),HPS(25),HAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S      RMF0340
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)       RMF0350
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA      RMF0360
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR      RMF0370
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)       RMF0380
      COMMON /HEIGHT/ HINT(3),HARE(3),BPHH(2),FH                              RMF0390
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE      RMF0400
     1(2)                                                                     RMF0410
      COMMON /RCGRID/ HRMIN,HRMAX,HSMIN,HSMAX                                 RMF0420
      COMMON /SUM/ AHHSUM(150), DMAX(2,5,150), HMAX(3,5,150)                  RMF0430
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                         RMF0440
      DIMENSION IFREQ(7), DEG(3), HSAV(250), RNAME(2,50), DUMR(24), HLH(      RMF0450
     12,24), LINE1(14), LINE2(14), LINE3(14), MODEL(2), DSAV(250), IHPS(      RMF0460
     225), IHAS(10), URREC(150), USREC(150), TITLE(2), GRANDS(150)            RMF0470
      DATA IFREQ /7*0/ ,DEG /90.,180.,270./ ,ICHAR /'I'/                      RMF0480
      DATA PL /0.15,0.15,0.20,0.25,0.40,0.60/                                 RMF0490
      DATA MODEL /'RURAL ','URBAN '/ ,TITLE /' SO2  ',' PART '/               RMF0500
      NRECEP=0                                                                RMF0510
      NPREC=0                                                                 RMF0520
                                                                              RMF0530
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      NP=0                                                              RMF0540
      IN=5                                                              RMF0550
      IO=6                                                              RMF0560
C***NID-DISK OR TAPE INPUT OF PREPROCESSED EMISSION DATA. LIMITED TO:   RMF0570
C***150 RECEPTORS,250 POINT SOURCES AND 100 AREA SOURCES                RMF0580
C***NIT-DISK INPUT OF MET DATA                                          RMF0590
C***UNIT 12 TAPE/DISK OUTPUT OF HOURLY CONCENTRATIONS                   RMF0600
C***UNIT 13 TAPE/DISK OUTPUT OF DAILY CONCENTRATIONS                    RMF0610
C***UNIT 14 DISK OUTPUT OF SUMMARY DATA                                 RMF0620
C***UNIT 15 - TAPE/DISK INPUT OF HOURLY POINT SOURCE EMISSIONS          RMF0630
C***UNIT 16 - TAPE/DISK INPUT OF HOURLY AREA SOURCE EMISSIONS           RMF0640
      NID=9                                                             RMF0650
      NIT=11                                                            RMF0660
C***THREE SYSTEMS OF LENGTH AND COORDINATES ARE USED IN RAM:            RMF0670
C***  THE FIRST SYSTEM, USER UNITS, IS SELECTED BY THE USER AND         RMF0680
C***   NORMALLY USE THE COORDINATE SYSTEM OF THE EMISSION INVENTORY.    RMF0690
C***   ALL LOCATIONS INPUT BY THE USER(SUCH AS SOURCES AND RECEPTORS)   RMF0700
C***   ARE IN THIS SYSTEM. ALSO AS A CONVENIENCE TO THE USER ALL        RMF0710
C***   LOCATIONS ON OUTPUT ARE ALSO IN THIS SYSTEM.                     RMF0720
C***  THE SECOND SYSTEM, INTERNAL UNITS, IS USED INTERNALLY IN RAM      RMF0730
C***   FOR COORDINATE LOCATIONS AND DISTANCES. ONE INTERNAL UNIT IS THE RMF0740
C***   SIDE LENGTH OF THE SMALLEST AREA SOURCE SQUARE. THIS LENGTH MUST RMF0750
C***   BE IDENTIFIED AND SPECIFIED BY THE USER. THE PUEPOSE OF USING    RMF0760
C***   INTERNAL UNITS IS TO HAVE A CORRESPONDENCE BETWEEN LOCATION(GRID RMF0770
C***   COORDINATES) AND PARTICULAR AREA SOURCE POSITIONS. THIS IS       RMF0780
C***   ACCOMPLISHED THROUGH THE USE OF THE AREA SOURCE MAP ARRAY(IA ARRAY RMF0790
C***   ). THIS ALLOWS DETERMINATION AS TO WITHIN WHICH AREA SOURCE ANY  RMF0800
C***   COORDINATE POINT RESIDES.                                        RMF0810
C***  THE THIRD SYSTEM,X,Y, IS AN UPWIND, CROSSWIND COORDINATE SYSTEM   RMF0820
C***   WITH REFERENCE TO EACH RECEPTOR. THE X-AXIS IS DIRECTED UPWIND   RMF0830
C***   (SAME AS WIND DIRECTION FOR THE PERIOD). IN ORDER TO DETERMINE   RMF0840
C***   DISPERSION PARAMETER VALUES AND EVALUATE EQUATIONS FOR           RMF0850
C***   CONCENTRATIONS, DISTANCES IN THIS SYSTEM MUST BE IN KILOMETERS.  RMF0860
C***                                                                    RMF0870
C***READ CARDS 1-3, IDENTIFICATION FOR TITLES.                          RMF0880
      READ (IN,940) LINE1,LINE2,LINE3                                   RMF0890
      WRITE (IO,950) LINE1,LINE2,LINE3                                  RMF0900
C***MODL IS INDICATOR FOR URBAN VERSION.                                RMF0910
      MODL=2                                                            RMF0920
      WRITE (IO,960)                                                    RMF0930
C***READ RAMQ OUTPUT FROM DISK OR TAPE; DATA IN INTERNAL UNITS.         RMF0940
      READ (NID) UNITS,CONTWO,CONONE,IPOL,NPT,IMPS,PHANE,IMOD           RMF0950
C***VERSION COMPATIBLE WITH RAMQ OUTPUT?                                RMF0960
      IF (IMOD.EQ.MODL) GO TO 10                                        RMF0970
      WRITE (IO,1000) MODEL(IMOD),MODEL(MODL)                           RMF0980
      CALL EXIT                                                         RMF0990
C***CONTINUE READING DATA TRANSFERRED FROM RAMQ.                        RMF1000
10    DO 20 I=1,9                                                       RMF1010
20    READ (NID) (SOURCE(I,J),J=1,NPT)                                  RMF1020
      READ (NID) NAS,NAS,RMIN,RMAX,SMIN,SMAX,IRSIZE,ISSIZE              RMF1030
      DO 30 I=1,6                                                       RMF1040
30    READ (NID) (ASORC(I,J),J=1,NAS)                                   RMF1050
      DO 40 I=1,IRSIZE                                                  RMF1060
40    READ (NID) (IA(I,J),J=1,ISSIZE)                                   RMF1070
C***                                                                    RMF1080
C***READ CARD 4.                                                        RMF1090
C***OPTION LIST***(SEE RUN STREAM EXAMPLES OF RAM FOR DETAILED          RMF1100
C***DESCRIPTION OF INPUT VARIABLES).                                    RMF1110
C***NAVG IS INTERMEDIATE AVERAGING TIME IN HOURS                        RMF1120
C***HAFL IS POLLUTANT HALF-LIFE IN SECONDS                              RMF1130
      READ (IN,970) IOPT,NPER,NAVG,Z,HAFL,NSIGP,NSIGA,IDATE,INSTRT     RMF1140
      WRITE (IO,1030) (I,IOPT(I),I=1,13)                                RMF1150
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      NDAYS=NAVG*NPER/24                                                RMF1160
      TLOS=693./HAFL                                                    RMF1170
C***693. = 0.693*1000 METERS/KM, TLOS IN METERS/KM-SEC.                 RMF1180
      IF (NAVG.EQ.0) CALL EXIT                                          RMF1190
C***READ SFC MET. STATION ID AND 2-DIGIT YEAR,                          RMF1200
C***MIXING HEIGHT STATION AND 2-DIGIT YEAR                              RMF1210
C***ONLY IF MET DATA IS FROM RAMMET                                     RMF1220
      IF (IOPT(11).EQ.1) GO TO 60                                       RMF1230
C***READ CARD TYPE 5 UNLESS USING OPTION 11.                            RMF1240
      READ (IN,970) ISFCD,ISFCYR,IMXD,IMXYR                             RMF1250
C***THE ABOVE FORMAT IS UNIVACS FREE FIELD INPUT.                       RMF1260
C***VARIABLES MUST BE SEPARATED BY COMMAS.                              RMF1270
C***THIS IS SIMILAR TO IBM'S LIST DIRECTED IO.                          RMF1280
C***CHECK TO INSURE CORRECT SURFACE DATA, MIXING HT. DATA, AND          RMF1290
C***PREPROCESSOR ARE BEING USED.                                        RMF1300
C***READ IDENTIFICATION RECORD FROM PREPROCESSED MET DISK OR TAPE FILE  RMF1310
      READ (NIT) ID,IYEAR,IDM,IYM                                       RMF1320
      IF (ISFCD.EQ.ID.AND.ISFCYR.EQ.IYEAR) GO TO 50                     RMF1330
      WRITE (IO,980) ISFCD,ISFCYR,ID,IYEAR                              RMF1340
      CALL EXIT                                                         RMF1350
50    IF (IMXD.EQ.IDM.AND.IMXYR.EQ.IYM) GO TO 60                        RMF1360
      WRITE (IO,990) IMXD,IMXYR,IDM,IYM                                 RMF1370
      CALL EXIT                                                         RMF1380
60    IP=IPOL-2                                                         RMF1390
      WRITE (IO,780) UNITS,CONONE,CONTWO,TITLE(IP),IPOL                 RMF1400
C***ECHO INPUT PARAMETERS                                               RMF1410
      WRITE (IO,790) NPER,NAVG,IDATE(2),IDATE(1),IHSTRT,Z,HAFL          RMF1420
      IF (IOPT(11).EQ.0) WRITE (IO,800) ISFCD,ISFCYR,IMXD,IMXYR         RMF1430
      WRITE (IO,810)                                                    RMF1440
C***IOPT(1) CONTROL OPTION, POINT SOURCE INPUT? 0=NO, 1=YES.            RMF1450
C***IF NO POINT SOURCES, SKIP DOWN TO AREA SOURCE CODE.                 RMF1460
      IF (IOPT(1).EQ.0) GO TO 150                                       RMF1470
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCE NUMBERS   RMF1480
C***0=NO, 1=YES.                                                        RMF1490
      IF (IOPT(12).EQ.0) GO TO 80                                       RMF1500
C***READ CARD TYPE 6 IF USING OPTIONS 1 AND 12.                         RMF1510
C***READ THE NUMBER OF SIGNIFICANT POINT SOURCES THAT USER WANTS TO     RMF1520
C***SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.               RMF1530
      READ (IN,870) INPT,(IMPS(I),I=1,INPT)                             RMF1540
      IF (INPT.EQ.0) GO TO 80                                           RMF1550
      IF (IMPS(INPT).EQ.0) WRITE (IO,880)                               RMF1560
      J=INPT+1                                                          RMF1570
      K=1                                                               RMF1580
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST     RMF1590
C***IF NSIGP GREATER THAN INPT.                                         RMF1600
      IF (J.GT.NSIGP) GO TO 100                                         RMF1610
      DO 70 I=J,NSIGP                                                   RMF1620
      IMPS(I)=IMPS(K)                                                   RMF1630
70    K=K+1                                                             RMF1640
      GO TO 100                                                         RMF1650
80    DO 90 I=1,NSIGP                                                   RMF1660
90    IMPS(I)=IMPS(I)                                                   RMF1670
100   WRITE (IO,950) LINE1,LINE2,LINE3                                  RMF1680
      WRITE (IO,820) NPT,NSIGP,(IMPS(I),I=1,NSIGP)                      RMF1690
      WRITE (IO,1050)                                                   RMF1700
      IF (IOPT(13).EQ.0) GO TO 120                                      RMF1710
C***SAVE AVERAGE EMISSION RATE                                          RMF1720
      DO 110 I=1,NPT                                                    RMF1730
110   PSAV(I)=SOURCE(IPOL,I)                                            RMF1740
C***WRITE OUT POINT SOURCE LIST.                                        RMF1750
120   DO 130 I=1,NPT                                                    RMF1760
C***CONVERT TO USER UNITS FOR PRINT OUT.                                RMF1770
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      C1=SOURCE(1,I)*UNITS                                                  RMF1730
      C2=SOURCE(2,I)*UNITS                                                  RMF1790
      WRITE (IO,1060) I,(PNAME(L,I),L=1,2),C1,C2,(SOURCE(K,I),K=3,8)        RMF1800
      IPSIGS(I)=0                                                           RMF1810
130   CONTINUE                                                              RMF1820
C***FILL IN SIGNIFICANT POINT SOURCE ARRAY                                  RMF1830
      DO 140 I=1,NSIGP                                                      RMF1840
      J=NPS(I)                                                              RMF1850
140   IPSIGS(J)=I                                                           RMF1860
C***IOPT(2) CONTROL OPTION, AREA SOURCE INPUT? 0=NO, 1=YES.                 RMF1870
C***IF NO AREA SOURCES, SKIP DOWN TO INPUTTING RECEPTORS.                   RMF1880
150   IF (IOPT(2).EQ.0) GO TO 260                                           RMF1890
C***READ CARD TYPE 7 IF USING OPTION 2.                                     RMF1900
      READ (IN,970) FH,XLIM,NHTS,(HINT(I),I=1,NHTS)                         RMF1910
      NBP=NHTS-1                                                            RMF1920
      IF (NBP.LE.0) NBP=1                                                   RMF1930
C***READ CARD TYPE 8 IF USING OPTION 2.                                     RMF1940
      READ (IN,970) (BPH(I),I=1,NBP)                                        RMF1950
C***CONVERT TO USER UNITS FOR PRINT OUT. XLIM IS CONVERTED TO KM.           RMF1960
      C1=RMIN*UNITS                                                         RMF1970
      C2=RMAX*UNITS                                                         RMF1980
      C3=SMIN*UNITS                                                         RMF1990
      C4=SMAX*UNITS                                                         RMF2000
      C5=XLIM                                                               RMF2010
      WRITE (IO,950) LINE1,LINE2,LINE3                                      RMF2020
      XLIM=XLIM*CONONE                                                      RMF2030
      IF (XLIM.LT.116.) GO TO 160                                           RMF2040
      WRITE (IO,1040) XLIM                                                  RMF2050
      CALL EXIT                                                             RMF2060
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCES? 0=NO,       RMF2070
C***  1=YES.                                                                RMF2080
160   IF (IOPT(12).EQ.0) GO TO 180                                          RMF2090
C***READ THE NUMBER OF SIGNIFICANT AREA SOURCES THAT USER                   RMF2100
C***WANTS TO SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.          RMF2110
      READ (IN,870) INAS,(NAS(I),I=1,INAS)                                  RMF2120
      IF (INAS.EQ.0) GO TO 180                                              RMF2130
      IF (NAS(INAS).EQ.0) WRITE (IO,890)                                    RMF2140
      J=INAS+1                                                              RMF2150
      K=1                                                                   RMF2160
      IF (J.GT.NSIGA) GO TO 200                                             RMF2170
      DO 170 I=J,NSIGA                                                      RMF2180
      NAS(I)=INAS(K)                                                        RMF2190
170   K=K+1                                                                 RMF2200
      GO TO 200                                                             RMF2210
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST         RMF2220
C***IF NSIGA GREATER THAN INAS.                                             RMF2230
180   DO 190 I=1,NSIGA                                                      RMF2240
190   NAS(I)=INAS(I)                                                        RMF2250
200   WRITE (IO,830) NAS,NSIGA,(INAS(I),I=1,NSIGA)                          RMF2260
      WRITE (IO,840) NHTS,(HINT(I),I=1,NHTS)                                RMF2270
      WRITE (IO,850) (BPH(I),I=1,NBP)                                       RMF2280
      WRITE (IO,860) FH,C5,C1,C2,C3,C4,IRSIZE,ISSIZE                        RMF2290
C***IF IA ARRAY TOO LARGE TO BE PRINTED AS A MAP, PRINTING IS SKIPPED.      RMF2300
      IF (IRSIZE.GT.41) GO TO 220                                           RMF2310
C***PRINT OUT AREA SOURCE MAP ARRAY.                                        RMF2320
      WRITE (IO,1010)                                                       RMF2330
      JLIM=ISSIZE+1                                                         RMF2340
      DO 210 JDUM=1,ISSIZE                                                  RMF2350
      J=JLIM-JDUM                                                           RMF2360
210   WRITE (IO,1020) J,(IA(I,J),I=1,IRSIZE)                                RMF2370
      WRITE (IO,1190) (I,I=1,IRSIZE)                                        RMF2380
                                                                            RMF2390
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      GO TO 230                                                          RMF2400
220   WRITE (IO,930)                                                     RMF2410
C***WRITE OUT THE AREA SOURCE LIST.                                      RMF2420
230   WRITE (IO,1070)                                                    RMF2430
      DO 240 I=1,NAS                                                     RMF2440
C***CONVERT TO USER UNITS FOR PRINT OUT                                  RMF2450
      C1=ASORC(1,I)*UNITS                                                RMF2460
      C2=ASORC(2,I)*UNITS                                                RMF2470
      C3=ASORC(5,I)*UNITS                                                RMF2480
      WRITE (IO,1080) I,C1,C2,(ASORC(K,I),K=3,4),C3,ASORC(6,I)           RMF2490
C***SIDE LENGTH IS MULTIPLIED BY .5 TO SAVE TIME IN LATER COMPUTATIONS   RMF2500
      ASORC(5,I)=ASORC(5,I)*0.5                                          RMF2510
      IASIGS(I)=0                                                        RMF2520
240   CONTINUE                                                           RMF2530
C***FILL IN SIGNIFICANT AREA SOURCE MARKER ARRAY                         RMF2540
      DO 250 I=1,NSIGA                                                   RMF2550
      J=MAS(I)                                                           RMF2560
250   IASIGS(J)=I                                                        RMF2570
C***INPUT PERMANENT RECEPTORS                                            RMF2580
C***IOPT(3) CONTROL OPTION, SPECIFIED RECEPTORS?  0 = NO, 1 = YES.       RMF2590
260   IF (IOPT(3).EQ.0) GO TO 300                                        RMF2600
270   NRECEP=NRECEP+1                                                    RMF2610
      IF (NRECEP.GT.150) GO TO 280                                       RMF2620
C***READ COORDINATES IN USER UNITS                                       RMF2630
C***ATTENTION USER: DON'T SPECIFY A RECEPTOR AT ORIGIN AS A BLANK CARD   RMF2640
C***IS USED TO INDICATE ALL RECEPTORS HAVE BEEN READ.                    RMF2650
C***READ CARD TYPE 10 IF USING OPTION 3.                                 RMF2660
      READ (IN,1090) (RNAME(J,NRECEP),J=1,2),URREC(NRECEP),USREC(NRECEP) RMF2670
C***BLANK CARD OR RECEPTOR AT ORIGIN SIGNALS ALL PERMANENT RECEPTORS      RMF2680
C***HAVE BEEN ENTERED.                                                   RMF2690
      IF (URREC(NRECEP)+USREC(NRECEP).LE.0.001) GO TO 280                RMF2700
      GO TO 270                                                          RMF2710
280   NRECEP=NRECEP-1                                                    RMF2720
C***SAVE NUMBER OF PERMANENT RECEPTORS                                   RMF2730
      NPREC=NRECEP                                                       RMF2740
C***PRINT OUT TABLE OF PERMANENT RECEPTORS***                            RMF2750
      WRITE (IO,950) LINE1,LINE2,LINE3                                   RMF2760
      WRITE (IO,1100)                                                    RMF2770
C***THE CHARACTER "I" INDICATES THAT THESE RECEPTORS WERE INPUT INTO      RMF2780
C***THE MODEL.                                                           RMF2790
      DO 290 K=1,NRECEP                                                  RMF2800
      ITYPE(K)=ICHAR                                                     RMF2810
      WRITE (IO,1110) K,ITYPE(K),(RNAME(J,K),J=1,2),URREC(K),USREC(K)    RMF2820
C***CONVERT TO INTERNAL UNITS                                            RMF2830
      RREC(K)=URREC(K)/UNITS                                             RMF2840
      SREC(K)=USREC(K)/UNITS                                             RMF2850
290   ICODE(K)=0                                                         RMF2860
C***IF NEITHER POINT OR AREA SOURCES WERE SPECIFIED,EXIT PROGRAM.        RMF2870
300   IF ((IOPT(1)+IOPT(2)).NE.0) GO TO 301                              RMF2880
      WRITE (IO,1120)                                                    RMF2890
      CALL EXIT                                                          RMF2900
C***READ IN THE NUMBER OF DAYS ALREADY PROCESSED AND LAST DAY TO BE      RMF2910
C***PROCESSED THIS RUN                                                   RMF2920
301   READ( IN,970) IDAY,LDRUN                                           RMF2930
      WRITE(IO,1200) IDAY,LDRUN                                          RMF2940
      IF(IDAY.LE.0) GO TO 310                                            RMF2950
C***POSITION OUTPUT FILES PAST LAST DAY PROCESSED                        RMF2960
      ISKIP=IDAY+2                                                       RMF2970
      DO 302 I=1,ISKIP                                                   RMF2980
302   READ(13)                                                           RMF2990
      ISKIP=IDAY*24+2                                                    RMF3000
      DO 303 I=1,ISKIP                                                   RMF3010
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303   READ(12)
C***READ SUMMARY INFORMATION                                          RMF3020
      READ(14) IDAYS,ANNSUM,DMAX,HMAX                                 RMF3030
      REWIND 14                                                       RMF3040
      IF(IDAY.EQ.IDAYS) GO TO 304                                     RMF3050
      WRITE(1210) IDAY,IDAYS                                          RMF3060
      CALL EXIT                                                       RMF3070
304   IF(IOPT(13).EQ.0) GO TO 308                                     RMF3080
C***POSITION HOURLY EMISSION FILES                                    RMF3090
      ISKIP=ISKIP-2                                                   RMF3100
      IF(IOPT(1).EQ.0) GO TO 306                                      RMF3110
      DO 305 I=1,ISKIP                                                RMF3120
305   READ(15)                                                        RMF3130
306   IF(IOPT(2).EQ.0) GO TO 308                                      RMF3140
      DO 307 I=1,ISKIP                                                RMF3150
307   READ(16)                                                        RMF3160
C***IOPT(11) CONTROL OPTION, READ MET. DATA FROM CARDS? 0=NO, 1=YES.  RMF3170
308   IF(IOPT(11).EQ.1) GO TO 360                                     RMF3180
C***POSITION MET FILE TO CORRECT POSITION                             RMF3190
      DO 309 I=1,IDAY                                                 RMF3200
309   READ(MIT) JYR                                                   RMF3210
      GO TO 360                                                       RMF3220
C***INITIALIZATION                                                    RMF3230
C***WRITE INITIAL IDENTIFICATION RECORDS ON OUTPUT TAPE & DISK         RMF3240
310   WRITE (13) NDAYS,LINE1,LINE2,LINE3                              RMF3250
      WRITE (13) NRECEP,(URREC(I),I=1,NRECEP),(USREC(J),J=1,NRECEP)   RMF3260
      WRITE (12) NDAYS,LINE1,LINE2,LINE3                              RMF3270
      WRITE (12) NRECEP,(URREC(I),I=1,NRECEP),(USREC(J),J=1,NRECEP)   RMF3280
360   IDAY=IDAY+1                                                     RMF3290
      NHRS=0                                                          RMF3300
      IF (IOPT(11).EQ.1) GO TO 400                                    RMF3310
C***INPUT MET DATA FOR EACH DAY FROM DISK CREATED BY RAMMET,IOPT(11)=0 RMF3320
      READ (MIT) JYR,IMO,DAY1,IKST,QU,QTEMP,DUMR,QTHETA,HLH           RMF3330
      IF (JYR.NE.IDATE(1)) GO TO 370                                  RMF3340
      IDATE(2)=DAY1                                                   RMF3350
      IF (IDATE(2).EQ.IDAY) GO TO 380                                 RMF3360
C***DATE ON MET TAPE DOES NOT MATCH INTERNAL DATE                     RMF3370
370   WRITE (IO,740) JYR,IDATE(2),IDATE(1),IDAY                       RMF3380
      CALL EXIT                                                       RMF3390
C***MODIFY WIND VECTOR BY 180 DEGREES. SINCE FLOW VECTORS WERE OUTPUT  RMF3400
C***FROM RAMMET, THIS CONVERTS BACK TO WIND DIRECTIONS.               RMF3410
380   DO 390 IQ=1,24                                                  RMF3420
      IF (IKST(IQ).EQ.7) IKST(IQ)=6                                   RMF3430
      QTHETA(IQ)=QTHETA(IQ)+180.                                      RMF3440
      IF (QTHETA(IQ).GT.360.) QTHETA(IQ)=QTHETA(IQ)-360.              RMF3450
C***URBAN MIXING HEIGHTS ARE USED FOR THIS APPLICATION                RMF3460
390   QHL(IQ)=HLH(2,IQ)                                               RMF3470
400   NB=IHSTRT                                                       RMF3480
      NE=NB+NAVG-1                                                    RMF3490
      IF (NB.GT.0) GO TO 410                                          RMF3500
      WRITE (IO,750) IHSTRT                                           RMF3510
      CALL EXIT                                                       RMF3520
410   WRITE (IO,950) LINE1,LINE2,LINE3                                RMF3530
      U=0.0                                                           RMF3540
      TEMP=0.0                                                        RMF3550
      DELN=0.0                                                        RMF3560
      DELM=0.0                                                        RMF3570
      DO 420 I=1,7                                                    RMF3580
420   IFREQ(I)=0.0                                                    RMF3590
      DO 440 I=NB,NE                                                  RMF3600
      JHR=I                                                           RMF3610
      IF (IOPT(11).EQ.0) GO TO 430                                    RMF3620
                                                                      RMF3630
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C***READ MET DATA FROM CARDS WITH FREE FORMAT                                   RMF3640
C***READ CARD TYPE 12 IF USING OPTION 11 ; JHR REDEFINED FROM METCARD.         RMF3650
      READ (IN,970) JYR,DAY1,JHR,IKST(JHR),QU(JHR),QTEMP(JHR),QTHETA(JHR       RMF3660
     1),QHL(JHR)
      IF (I.NE.NB) GO TO 430                                                    RMF3670
      IDATE(1)=JYR                                                              RMF3680
      IHSTRT=JHR                                                                RMF3690
      ISTDAY=DAY1                                                               RMF3700
      IDATE(2)=ISTDAY                                                           RMF3710
430   IF(I.EQ.NB) WRITE (IO,1130) IDATE                                         RMF3720
      TRAD=QTHETA(JHR)*0.01745329                                               RMF3730
      IF(IKST(JHR).EQ.7) IKST(JHR)=6                                            RMF3740
      WRITE (IO,1140) JHR,QTHETA(JHR),QU(JHR),QHL(JHR),QTEMP(JHR),IKST(J        RMF3750
     1HR)                                                                       RMF3760
      SINT=SIN(TRAD)                                                            RMF3770
      COST=COS(TRAD)                                                            RMF3780
C***CALCULATE WIND COMPONENTS                                                   RMF3790
      URES=QU(JHR)                                                              RMF3800
      UR=URES*SINT                                                              RMF3810
      VR=URES*COST                                                              RMF3820
      DELM=DELM+UR                                                              RMF3830
      DELN=DELN+VR                                                              RMF3840
      TEMP=TEMP+QTEMP(JHR)                                                      RMF3850
      U=U+URES                                                                  RMF3860
      KST=IKST(JHR)                                                             RMF3870
440   IFREQ(KST)=IFREQ(KST)+1                                                   RMF3880
C***REDEFINE NB AND NE IN CASE NON-CONSECUTIVE DAYS ARE BEING RUN               RMF3890
      IF(IOPT(11).EQ.0) GO TO 441                                               RMF3900
      NB=IHSTRT                                                                 RMF3910
      NE=IHSTRT+NAVG-1                                                          RMF3920
C***CALCULATE RESULTANT  WIND DIRECTION THETA                                   RMF3930
441   DELN=DELN/NAVG                                                            RMF3940
      DELM=DELM/NAVG                                                            RMF3950
      THETA=ANGARC(DELM,DELN)                                                   RMF3960
C***CALCULATE AVERAGE AND RESULTANT SPEED                                       RMF3970
      U=U/NAVG                                                                  RMF3980
      TEMP=TEMP/NAVG                                                            RMF3990
      URES=SQRT(DELN*DELN+DELM*DELM)                                            RMF4000
      PERSIS=URES/U                                                             RMF4010
C***DETERMINE MODAL AND AVERAGE STABILITY                                       RMF4020
      LSMAX=0                                                                   RMF4030
      DO 450 I=1,7                                                              RMF4040
      LST=IFREQ(I)                                                              RMF4050
      IF (LST.LE.LSMAX) GO TO 450                                               RMF4060
      LSMAX=LST                                                                 RMF4070
      LSTAB=I                                                                   RMF4080
450   CONTINUE                                                                  RMF4090
      IP1=LSTAB+1                                                               RMF4100
      KST=LSTAB                                                                 RMF4110
      DO 460 I=IP1,7                                                            RMF4120
      IF (LSMAX.EQ.IFREQ(I)) GO TO 470                                          RMF4130
460   CONTINUE                                                                  RMF4140
      GO TO 490                                                                 RMF4150
C***IF TIE FOR MAX MODAL STABILITY CALCULATE AVERAGE STABILITY                  RMF4160
470   KSUM=0                                                                    RMF4170
      DO 480 J=1,7                                                              RMF4180
480   KSUM=KSUM+IFREQ(J)*J                                                      RMF4190
      KST=FLOAT(KSUM)/FLOAT(NAVG)+0.5                                           RMF4200
C***OUTPUT RESULTANT MET CONDITIONS***                                          RMF4210
490   WRITE (IO,1150)                                                           RMF4220
      WRITE (IO,1160) THETA,URES,U,TEMP,PERSIS,KST                              RMF4230
      TRAD=THETA*0.01745329                                                     RMF4240
                                                                                RMF4250
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      SINT=SIN(TRAD)                                                    RMF4260
      COST=COS(TRAD)                                                    RMF4270
C***INITIALIZE CONCENTRATION SUMS                                       RMF4280
C***INITIALIZE FOR AVERAGING TIME                                       RMF4290
      DO 550 K=1,NRECEP                                                 RMF4300
      ACHI(K)=0.0                                                       RMF4310
      PCHI(K)=0.0                                                       RMF4320
      DO 530 I=1,11                                                     RMF4330
530   ASIGS(K,I)=0.0                                                    RMF4340
      DO 540 I=1,26                                                     RMF4350
540   PSIGS(K,I)=0.0                                                    RMF4360
550   CONTINUE                                                          RMF4370
C***                                                                    RMF4380
C***LOOP ON HOURS                                                       RMF4390
C***                                                                    RMF4400
570   DO 700 ILH=NB,NE                                                  RMF4410
      LH=ILH                                                            RMF4420
      IF (LH.LE.24) GO TO 580                                           RMF4430
      LH=MOD(ILH,24)                                                    RMF4440
      IF (LH.EQ.1) IDATE(2)=DAY1                                        RMF4450
C***INITIALIZE HOURLY ARRAYS                                            RMF4460
580   DO 610 K=1,NRECEP                                                 RMF4470
      AHCHI(K)=0.0                                                      RMF4480
      PHCHI(K)=0.0                                                      RMF4490
      DO 590 I=1,11                                                     RMF4500
590   AHSIGS(K,I)=0.0                                                   RMF4510
      DO 600 I=1,26                                                     RMF4520
600   PHSIGS(K,I)=0.0                                                   RMF4530
610   CONTINUE                                                          RMF4540
C***SET MET CONDITIONS FOR THIS HOUR***                                 RMF4550
      THETA=QTHETA(LH)                                                  RMF4560
      U=QU(LH)                                                          RMF4570
      HL=QHL(LH)                                                        RMF4580
      TEMP=QTEMP(LH)                                                    RMF4590
      KST=IKST(LH)                                                      RMF4600
C***DETERMINE WIND DIRECTION CONTROL, IWD, 90 DEG. QUADRANT OF WIND     RMF4610
C***                                                                    RMF4620
      DO 620 I=1,3                                                      RMF4630
      IF (THETA.LE.DEG(I)) GO TO 630                                    RMF4640
620   CONTINUE                                                          RMF4650
      I=4                                                               RMF4660
630   IWD=I                                                             RMF4670
      TRAD=THETA*0.01745329                                             RMF4680
      SINT=SIN(TRAD)                                                    RMF4690
      COST=COS(TRAD)                                                    RMF4700
C***CHECK FOR POINT SOURCES                                             RMF4710
      IF (IOPT(1).NE.1) GO TO 650                                       RMF4720
C***IOPT(13) CONTROL OPTION, HOURLY EMISSIONS INPUT? 0=NO, 1=YES        RMF4730
      IF (IOPT(13).EQ.0) GO TO 640                                      RMF4740
      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                              RMF4750
C***READ HOURLY POINT SOURCE RECORD                                     RMF4760
      READ (15) IDATP,(SOURCE(IPOL,I),I=1,NPT)                          RMF4770
C***CHECK DATE                                                          RMF4780
      IF (IDCK.EQ.IDATP) GO TO 640                                      RMF4790
      WRITE (IO,910) IDCK,IDATP                                         RMF4800
      CALL EXIT                                                         RMF4810
C***CALCULATE POINT SOURCE CONTRIBUTIONS                                RMF4820
640   CALL JHRPTU (HSAV,DSAV,Z,TLOS,LH)                                 RMF4830
C***CHECK FOR AREA SOURCES                                              RMF4840
650   IF (IOPT(2).NE.1) GO TO 680                                       RMF4850
C***IOPT(13) CONTROL OPTION, HOURLY EMISSION INPUT? 0=NO, 1=YES         RMF4860
      IF (IOPT(13).EQ.0) GO TO 675                                      RMF4870
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      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                              RMF4880
C***READ HOURLY AREA SOURCE EMISSION RECORD                             RMF4890
      READ (16) IDATA,(ASORC(IPOL,I),I=1,NAS)                           RMF4900
C***CHECK DATE                                                          RMF4910
      IF (IDCK.EQ.IDATA) GO TO 660                                      RMF4920
      WRITE (10,920) IDCK,IDATA                                         RMF4930
      CALL EXIT                                                         RMF4940
C***CONVERT HOURLY AREA EMISSIONS FROM G/SEC TO G/SQ. M/SEC             RMF4950
660   DO 670 I=1,NAS                                                    RMF4960
C***CONVERT SIDE LENGTH TO METERS.                                      RMF4970
C***NOTE: SIDE LENGTH HAD BEEN MULTIPLIED BY .5 ABOVE FOR TIME         RMF4980
C***CONSIDERATIONS                                                      RMF4990
      SI=ASORC(5,I)*2000*CONTWO                                         RMF5000
670   ASORC(IPOL,I)=ASORC(IPOL,I)/(SI*SI)                               RMF5010
C***SET UP INTEGRATION TABLES FOR AREA SOURCE CALCULATIONS***           RMF5020
675   CALL JHH540 (HHTS,Z,HLIM,TLOS)                                    RMF5030
C***CALCULATE AREA SOURCE CONTRIBUTIONS                                 RMF5040
      CALL JHHARE (HHTS,HLIM,LH)                                        RMF5050
C***WRITE HOURLY CONCENTRATIONS TO TAPE                                 RMF5060
680   DO 681 I=1,NRECEP                                                 RMF5070
681   GRANDS(I)=ARCHI(I)+PRCHI(I)                                       RMF5080
      WRITE(12) IDATE(2),LH,(GRANDS(I),I=1,NRECEP)                      RMF5090
C***SAVE HOURLY MAXIMUMS                                                RMF5100
      DO 690 K=1,NRECEP                                                 RMF5110
      IF(GRANDS(K).LE.HMAX(1,5,K)) GO TO 690                            RMF5120
C***CONCENTRATION IS ONE OF THE TOP 5                                   RMF5130
      DO 682 J=1,5                                                      RMF5140
      IF(GRANDS(K).GT.HMAX(1,J,K)) GO TO 683                            RMF5150
682   CONTINUE                                                          RMF5160
      WRITE(10,1220)                                                    RMF5170
      GO TO 690                                                         RMF5180
C***INSERT IN PROPER POSITION                                           RMF5190
683   IF(J.EQ.5) GO TO 685                                              RMF5200
      DO 684 IJ=4,J,-1                                                  RMF5210
      IJP1=IJ+1                                                         RMF5220
      HMAX(1,IJP1,K)=HMAX(1,IJ,K)                                       RMF5230
      HMAX(2,IJP1,K)=HMAX(2,IJ,K)                                       RMF5240
684   HMAX(3,IJP1,K)=HMAX(3,IJ,K)                                       RMF5250
685   HMAX(1,J,K)=GRANDS(K)                                             RMF5260
      HMAX(2,J,K)=DAY1                                                  RMF5270
      HMAX(3,J,K)=LH                                                    RMF5280
690   CONTINUE                                                          RMF5290
700   CONTINUE                                                          RMF5300
      IF(NE.GT.24) IDATE(2)=ISTDAY                                      RMF5310
C***OUTPUT FINAL RESULTS                                                RMF5320
      CALL JHHFD (NB,LINE1,LINE2,LINE3)                                 RMF5330
      NP=NP+1                                                           RMF5340
      NHRS=NHRS+NAVG                                                    RMF5350
      IF(NP.GE.NPER) GO TO 720                                          RMF5360
      IF(NHRS.LT.24) GO TO 710                                          RMF5370
      IF(IDAY-LDRUN) 360,720,720                                        RMF5380
710   NB=NB+NAVG                                                        RMF5390
      NE=NE+NAVG                                                        RMF5400
      IF(NB.LE.24) GO TO 410                                            RMF5410
      NB=MOD(NB,24)                                                     RMF5420
      NE=NB+NAVG-1                                                      RMF5430
      GO TO 410                                                         RMF5440
720   END FILE 12                                                       RMF5450
      END FILE 12                                                       RMF5460
      END FILE 13                                                       RMF5470
      END FILE 13                                                       RMF5480
C***WRITE SUMMARY INFORMATION ON DISK                                   RMF5490
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      WRITE (14) IDAY,ANNSUM,DMAX,HMAX                                  RMF5500
      IF (LDRUN.NE.NDAYS) CALL EXIT                                     RMF5510
C***PRINT SUMMARY TABLES                                                RMF5520
      WRITE(IO,950) LINE1,LINE2,LINE3                                   RMF5530
      WRITE(IO,1230) (I,I=1,5)                                          RMF5540
      DO 725 K=1,NRECEP                                                 RMF5550
      ANMEAN=ANNSUM(K)/NDAYS                                            RMF5560
      WRITE(IO,1240) K,(DMAX(1,J,K),DMAX(2,J,K),J=1,5),ANMEAN           RMF5570
725   CONTINUE                                                          RMF5580
      WRITE(IO,950) LINE1,LINE2,LINE3                                   RMF5590
      WRITE(IO,1250) (I,I=1,5)                                          RMF5600
      DO 730 K=1,NRECEP                                                 RMF5610
      WRITE(IO,1260) K,(HMAX(1,J,K),HMAX(2,J,K),HMAX(3,J,K),J=1,5)      RMF5620
730   CONTINUE                                                          RMF5630
      CALL EXIT                                                         RMF5640
740   FORMAT (' DATE ON MET. TAPE, ',I2,I3,' ,DOES NOT MATCH INTERNAL DA RMF5650
     1TE, ',I2,I3)                                                      RMF5660
750   FORMAT (' HOUR ',I3,' IS NOT PERMITTED. HOURS MUST BE DEFINED BETW RMF5670
     1EEN 1 AND 24')                                                    RMF5680
780   FORMAT (1X,T21,'GENERAL INFORMATION FROM RAMQ'//2X,'UNITS - THERE  RMF5690
     1ARE',F14.7,' USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUA RMF5700
     2RE SIDE LENGTH (INTERNAL UNIT)'/2X,'CONONE - THERE ARE',F14.7,' KI RMF5710
     3LOMETERS PER USER UNIT'/2X,'CONTWO - IT IS CALCULATED THAT THERE A RMF5720
     4RE',F14.7,' KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH RMF5730
     5 (INTERNAL UNIT)'/2X,'THIS RUN IS FOR ',A6,'SINCE IPOL=',I2//1X)  RMF5740
790   FORMAT (1X,T21,'GENERAL INPUT DATA'//2X,'NUMBER OF PERIODS TO BE S RMF5750
     1IMULATED(NPER)= ',I3/2X,'AVERAGING TIME IN HOURS FOR EACH PERIOD(N RMF5760
     2AVG)= ',I5/2X,'STARTING DATE(IDATE(2),IDATE(1),IHSTRT): JULIAN DAY RMF5770
     3 ',I4,', YEAR 19',I2,' HOUR= ',I2/2X,'RECEPTOR HEIGHT FOR ALL RECE RMF5780
     4PTORS(Z) ',F6.3,' METERS'/2X,'ASSUMED POLLUTANT HALF-LIFE(HAFL) ', RMF5790
     5F10.2,' SECONDS')                                                 RMF5800
800   FORMAT (2X,'SURFACE MET DATA FROM STATION(ISFCD) ',I6,', YEAR(ISFC RMF5810
     1YR) 19',I2/2X,'MIXING HEIGHT DATA FROM STATION(IMXD) ',I6,', YEAR( RMF5820
     2IMXYR) 19',I2)                                                    RMF5830
810   FORMAT (//1X)                                                     RMF5840
820   FORMAT ('0',T21,'POINT SOURCE INFORMATION'//2X,'EMISSION INFORMATI RMF5850
     1ON FOR ',I4,' (NPT) POINT SOURCES HAS BEEN DETERMINED BY RAMQ'/2X, RMF5860
     2I2,' SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN' RMF5870
     3/2X,'THE ORDER OF SIGNIFICANCE(IMPS) FOR 25 OR LESS POINT SOURCES  RMF5880
     4DETERMINED BY RAMQ IS LISTED BY POINT SOURCE NUMBER:'/2X,2515)    RMF5890
830   FORMAT (//1X,T21,'AREA SOURCE INFORMATION'//2X,'EMISSION INFORMATI RMF5900
     1ON FOR ',I4,' (NAS) AREA SOURCES HAS BEEN DETERMINED BY RAMQ'/2X,I RMF5910
     22,' SIGNIFICANT AREA SOURCES(NSIGA) ARE TO BE USED FOR THIS RUN'/2 RMF5920
     3X,' THE ORDER OF SIGNIFICANCE(IMAS) FOR 10 OR LESS  AREA SOURCES D RMF5930
     4ETERMINED BY RAMQ IS LISTED BY  AREA SOURCE NUMBER:'/2X,1015)     RMF5940
840   FORMAT (2X,'NUMBER OF AREA HEIGHT CLASSES(NHTS)=',I2/2X,'REPRESENT RMF5950
     1ATIVE AREA SOURCE HEIGHTS FOR EACH HEIGHT CLASS(HINT) IN METERS=', RMF5960
     23F10.2)                                                           RMF5970
850   FORMAT (2X,'BREAK POINT HEIGHT BETWEEN THE AREA HEIGHT CLASSES(BPH RMF5980
     1) IN METERS=',2F10.2)                                             RMF5990
860   FORMAT (2X,'FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGH RMF6000
     1T(FH)=',F10.3/2X,'LIMIT OF DISTANCE FOR AREA SOURCE INTEGRATION TA RMF6010
     2BLES(XLIM) IN USER UNITS =',F10.3/2X,'BOUNDARIES OF THE AREA SOURC RMF6020
     3E GRID IN USER UNITS:'/1X,T6,'RMIN=',F10.3,5X,'RMAX=',F10.3,5X,'SM RMF6030
     4IN=',F10.3,5X,'SMAX=',F10.3/2X,'SIZE(IRSIZE X ISSIZE) OF AREA SOUR RMF6040
     5CE MAP ARRAY(IA) IN INTERNAL UNITS =',I3,' EAST-WEST BY ',I3,' NOR RMF6050
     6TH-SOUTH'//1X)                                                    RMF6060
870   FORMAT (26I3)                                                     RMF6070
880   FORMAT (' ***ERROR IN SPECIFYING SIGNIF. POINT SOURCES***')       RMF6080
890   FORMAT (' ***ERROR IN SPECIFYING SIGNIF. AREA SOURCES***')        RMF6090
900   FORMAT (' ***PLEASE NOTE: THE RECEPTOR NUMBERS AND LOCATIONS GENER RMF6100
     1ATED FOR THIS AVERAGING TIME PERIOD ARE DIFFERENT FROM THOSE GENER RMF6110
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     2ATED FOR'/18X,' THE PRECEEDING AVERAGING PERIOD.***')                    RMF6120
 910  FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY POINT E RMF6130
     1MISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')        RMF6140
 920  FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY AREA EM RMF6150
     1ISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')         RMF6160
 930  FORMAT (' AREA ARRAY IS TOO WIDE FOR PAGE SIZE, THEREFORE WILL NOT RMF6170
     1 BE PRINTED.')                                                           RMF6180
 940  FORMAT (13A6,A2/13A6,A2/13A6,A2)                                          RMF6190
 950  FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                                RMF6200
 960  FORMAT ('0THIS IS THE NORMAL URBAN VERSION(73124) OF RAMF FOR APPL RMF6210
     1ICATION TO ONE OR SEVERAL DAYS DATA.'/1X)                                RMF6220
 970  FORMAT ()                                                                 RMF6230
 980  FORMAT (' SURFACE DATA IDENTIFERS READ INTO MODEL (STATION=',I5,' RMF6240
     1,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X, RMF6250
     2' (STATION=',I5,' ,YEAR=',I2)                                            RMF6260
 990  FORMAT (' MIXING HEIGHT IDENTIFERS READ INTO MODEL (STATION=',I5,' RMF6270
     1 ,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X RMF6280
     2,' (STATION=',I5,' ,YEAR=',I2)                                           RMF6290
1000  FORMAT (' *** THE ',A6,'VERSION OF THE PREPROCESSOR CAN NOT BE USE RMF6300
     1D WITH THE ',A6,'VERSION OF THE MODEL***')                               RMF6310
1010  FORMAT ('0',13X,'AREA SOURCE MAP ARRAY(IA)'/1X)                           RMF6320
1020  FORMAT (1X,I3,2X,4I3/1X)                                                  RMF6330
1030  FORMAT (1X,T3,'OPTION  ',T16,'OPTION LIST',T46,'OPTION SPECIFICATI RMF6340
     1ON : 0= IGNORE OPTION'/1X,T68,' 1= USE OPTION'/1X,T7,I2,T16,'POINT RMF6350
     2 SOURCE DATA',T51,I1/1X,T7,I2,T16,'AREA SOURCE DATA',T51,I1/1X,T7, RMF6360
     3I2,T16,'PERMANENT RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT POIN RMF6370
     4T RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT AREA RECEPTORS',T51, RMF6380
     5I1/1X,T7,I2,T16,'HONEYCOMB RECEPTORS',T51,I1/1X,T7,I2,T16,'HOURLY  RMF6390
     6OUTPUT',T51,I1/1X,T7,I2,T16,'PARTIAL CONC. WRITTEN TO DISK/TAPE',T RMF6400
     751,I1/1X,T7,I2,T16,'PRINT ONLY SUMMARY HOURLY OUTPUT',,T51,I1/1X,T RMF6410
     87,I2,T16,'PUNCH CARDS FOR CONTOURS',T51,I1/1X,T7,I2,T16,'READ MET  RMF6420
     9DATA FROM CARDS',T51,I1/1X,T7,I2,T16,'SPECIFY SIGNIFICANT SOURCE N RMF6430
     AUMBERS',T51,I1/1X,T7,I2,T16,'READ HOURLY EMISSIONS',T51,I1/1X)       RMF6440
1040  FORMAT (' THE INPUT LIMIT OF MAX DISTANCE FOR AREA INTEGRATION ',' RMF6450
     1 CONVERTS TO ',F10.3,' KM WHICH EXCEEDS STORAGE ','LIMITATIONS. UP RMF6460
     2  TO 116 KM DISTANCES ARE ALLOWED.')                                    RMF6470
1050  FORMAT ('0',T50,'POINT SOURCE LISTING'//1X,T8,'SOURCE',T25,'EAST', RMF6480
     1T33,'NORTH',T40,'SO2(G/SEC)  PART(G/SEC)  STACK  STACK   STACK     RMF6490
     2  STACK'/1X,T25,'COORD',T33,'COORD  EMISSIONS   EMISSIONS    HT(M) RMF6500
     3  TEMP(K) ','DIAM(M) VEL(M/SEC)'/1X,T26,'(USER UNITS)'/1X)               RMF6510
1060  FORMAT (1X,T3,I3,1X,2A6,2X,2F9.2,F10.2,F11.2,2X,4F8.2)                    RMF6520
1070  FORMAT (/1X,T20,'AREA SOURCE LISTING'//1X,T2,'SOURCE',T10,'EAST',T RMF6530
     118,'NORTH',T26,'SO2(G/SEC-M**2)',T44,'PART(G/SEC-M**2)  SIDE       RMF6540
     2EFFECTIVE'/1X,T10,'COORD   COORD',T29,'EMISSIONS',T46,'EMISSIONS', RMF6550
     3T61,'LENGTH    HEIGHT'/1X,T11,'(USER UNITS)',T58,'(USER UNITS)',T7 RMF6560
     44,'(M)'/1X)                                                              RMF6570
1080  FORMAT (1X,T3,I3,2X,2F9.1,3X,1PE11.4,7X,1PE11.4,3X,0PF7.1,3X,F7.1) RMF6580
1090  FORMAT (2A4,2F10.3)                                                       RMF6590
1100  FORMAT ('0',T9,'INPUT RECEPTORS'//1X,'RECEPTOR    IDENTIFICATION   RMF6600
     1EAST     NORTH    '/1X,T30,'COORD',T39,'COORD'/1X,T31,'(USER UNITS RMF6610
     2)'/1X)                                                                   RMF6620
1110  FORMAT (1X,T4,I2,1X,A1,8X,2A4,7X,F6.2,3X,F7.2)                            RMF6630
1120  FORMAT (1X,'NO SOURCES SPECIFIED')                                        RMF6640
1130  FORMAT ('0INPUT MET DATA  ',I2,'/',I4/1X,T2,'HOUR   THETA    SPEED RMF6650
     1   MIXING   TEMP     STABILITY'/1X,T9,'(DEG)    (M/S)  HEIGHT(M) ( RMF6660
     2DEG-K)  CLASS'/1X)                                                       RMF6670
1140  FORMAT (1X,T3,I2,4F9.2,6X,I1)                                             RMF6680
1150  FORMAT ('0','RESULTANT MET CONDITIONS'/1X)                                RMF6690
1160  FORMAT (2X,'WIND DIRECTION=',F7.2,T36,'RESULTANT WIND SPEED=',F7.2 RMF6700
     1/2X,'AVERAGE WIND SPEED=',F7.2,T36,'AVERAGE TEMP=',F7.2/2X,'WIND P RMF6710
     2ERSISTENCE=',F6.3,T36,'MODAL STABILITY=',I2)                             RMF6720
1170  FORMAT ('0',T20,'GENERATED HONEYCOMB RECEPTORS'/1X,/1X,'THE AREA T RMF6730
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     1O BE COVERED BY HONEYCOMB RECEPTORS IS BOUNDED BY:'/1X,' RMIN=',F1 RMF6740
     220.3,' RMAX=',F10.3,' SMIN=',F10.3,' SMAX=',F10.3//1X,'DISTANCE BET RMF6750
     3WEEN HONEYCOMB RECEPTORS(GRIDSP) IN USER UNITS=',F7.3//1X,'RECEPTO RMF6760
     4R     EAST      NORTH')                                             RMF6770
1180  FORMAT (1X,'NO RECEPTORS HAVE BEEN CHOSEN')                         RMF6780
1190  FORMAT (/6X,4I13/1X)                                                RMF6790
C                                                                         RMF6800
1200  FORMAT (//1X,' THE NUMBER OF PERIODS PREVIOUSLY COMPLETED EQUAL     RMF6810
     1I3,' AND THE LAST PERIOD TO BE COMPLETED IN THIS RUN IS ',I3)       RMF6820
1210  FORMAT (' NUMBER OF DAYS PREVEIOUSLY PROCESSED, ',I4,' DOES NOT AG RMF6830
     1REE WITH LAST DAY WRITTEN IN SUMMARY FILE, ',I4/1X,'NON-CONSECUTIV RMF6840
     2E DAYS CANNOT BE PROCESSED')                                       RMF6850
1220  FORMAT (' ERROR IN FINDING NMAX')                                   RMF6860
1230  FORMAT (/1X,T41,'FIVE HIGHEST 24-HOUR CONCENTRATIONS((JULIAN DAY M RMF6870
     1AX OCCURS)'/1X,T49,'(MICROGRAMS/M**3)'//2X,'RECEPTOR NO.',3X,4(I1, RMF6880
     216X),I1,11X,'MEAN CONCENTRATION'/1X)                               RMF6890
1240  FORMAT (1X,T5,I2,5X,5(4X,6PF7.2,'(',0PF4.0,')'),7X,6PF7.2)          RMF6900
1250  FORMAT (/1X,T41,'FIVE HIGHEST 1-HOUR CONCENTRATIONS(JULIAN DAY MAX RMF6910
     1 OCCURS, HOUR)'/1X,T49,'(MICROGRAMS/M**3)'//2X,'RECEPTOR NO.',11X, RMF6920
     224(I1,20X),I1/1X)                                                  RMF6930
1260  FORMAT (1X,T5,I2,5X,5(4X,6PF7.2,'(',0PF4.0,',',F3.0,')'))          RMF6940
      END                                                                 RMF6950
```

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      SUBROUTINE JMHFD  (NB,LINE1,LINE2,LINE3)
C***THIS ROUTINE IS RESPONSIBLE FOR PRINTING TABLES OF TOTAL AND          FD00010
C***AVERAGE CONCENTRATION FROM SIGNIFICANT POINT AND AREA SOURCES.        FD00020
C***A SUMMARY TABLE OF THE METEOROLOGICAL CONDITIONS FOR EACH HOUR        FD00030
C***AND THE RESULTANT CONDITIONS FOR THE PERIOD(IF LESS THAN 24 HOURS)    FD00040
C***IS ALSO PRINTED. CONCENTRATIONS ARE PRINTED IN MICROGRAMS PER CUBIC   FD00050
C***METER.                                                                FD00060
C         INPUT VARIABLES ARE:                                            FD00070
C         NB- START HOUR OF AVERAGING TIME                                FD00080
C         LINE1- FIRST LINE OF TITLE                                      FD00090
C         LINE2- SECOND LINE OF TITLE                                     FD00100
C         LINE3- THIRD LINE OF TITLE                                      FD00110
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR  FD00120
     1EC(150),SREC(150),MPS(25),MAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S  FD00130
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)   FD00140
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA  FD00150
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,EPH(2),IWD,PAR  FD00160
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)   FD00170
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE  FD00180
     1(2)                                                                 FD00190
      COMMON /SUM/ ANNSUM(150),DMAX(2,5,150),HMAX(3,5,150)                FD00200
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                     FD00210
      DIMENSION GRANDT(150), IRANK(150), GRANDS(150), IPOLT(2), LINE1(14  FD00220
     1), LINE2(14), LINE3(14)                                             FD00230
      DATA IPOLT /'SO2 ','PART'/                                          FD00240
      IPOLU=IPOLT(1)                                                      FD00250
      IF (IPOL.EQ.4) IPOLU=IPOLT(2)                                       FD00260
C***AVERAGE CONCENTRATIONS OVER SPECIFIED TIME PERIOD                     FD00270
      DO 30 K=1,NRECEP                                                    FD00280
      ACHI(K)=ACHI(K)/NAVG                                                FD00290
      PCHI(K)=PCHI(K)/NAVG                                                FD00300
      GRANDT(K)=ACHI(K)+PCHI(K)                                           FD00310
      GRANDS(K)=GRANDT(K)                                                 FD00320
      DO 10 I=1,11                                                        FD00330
10    ASIGS(K,I)=ASIGS(K,I)/NAVG                                          FD00340
      DO 20 I=1,26                                                        FD00350
                                                                          FD00360
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20      PSIGS(K,I)=PSIGS(K,I)/NAVG                                      FD00370
30      CONTINUE                                                        FD00380
C***                                                                    FD00390
C***WRITE POINT SOURCE TABLE                                            FD00400
        IF (IOPT(1).EQ.0) GO TO 110                                     FD00410
        WRITE (IO,180) LINE1,LINE2,LINE3                                FD00420
        WRITE (IO,190) NAVG,IPOLU,IDATE,NB                              FD00430
        IF (NSIGP.GT.10) GO TO 50                                       FD00440
C***PRINT FIRST PAGE OF OUTPUT AND TOTALS                               FD00450
        WRITE (IO,200) (I,I=1,NSIGP)                                    FD00460
        WRITE (IO,210)                                                  FD00470
        WRITE (IO,220) (NPS(I),I=1,NSIGP)                               FD00480
        WRITE (IO,230)                                                  FD00490
        DO 40 K=1,NRECEP                                                FD00500
        WRITE (IO,240) K,(PSIGS(K,I),I=1,NSIGP)                         FD00510
C***PRINT TOTALS***                                                     FD00520
        WRITE (IO,250) PSIGS(K,26),PCHI(K)                              FD00530
40      CONTINUE                                                        FD00540
        GO TO 110                                                       FD00550
C***PRINT FIRST PAGE                                                    FD00560
50      WRITE (IO,200) (I,I=1,10)                                       FD00570
        WRITE (IO,260) (NPS(I),I=1,10)                                  FD00580
        WRITE (IO,230)                                                  FD00590
        DO 60 K=1,NRECEP                                                FD00600
60      WRITE (IO,240) K,(PSIGS(K,I),I=1,10)                            FD00610
        IF (NSIGP.GT.20) GO TO 80                                       FD00620
C***PRINT SECOND PAGE AND TOTALS                                        FD00630
        WRITE (IO,180) LINE1,LINE2,LINE3                                FD00640
        WRITE (IO,190) NAVG,IPOLU,IDATE,NB                              FD00650
        WRITE (IO,200) (I,I=11,NSIGP)                                   FD00660
        WRITE (IO,210)                                                  FD00670
        WRITE (IO,220) (NPS(I),I=11,NSIGP)                              FD00680
        WRITE (IO,230)                                                  FD00690
        DO 70 K=1,NRECEP                                                FD00700
        WRITE (IO,240) K,(PSIGS(K,I),I=11,NSIGP)                        FD00710
70      WRITE (IO,250) PSIGS(K,26),PCHI(K)                              FD00720
        GO TO 110                                                       FD00730
C***WRITE SECOND PAGE***                                                FD00740
80      WRITE (IO,180) LINE1,LINE2,LINE3                                FD00750
        WRITE (IO,190) NAVG,IPOLU,IDATE,NB                              FD00760
        WRITE (IO,200) (I,I=11,20)                                      FD00770
        WRITE (IO,260) (NPS(I),I=11,20)                                 FD00780
        WRITE (IO,230)                                                  FD00790
        DO 90 K=1,NRECEP                                                FD00800
90      WRITE (IO,240) K,(PSIGS(K,I),I=11,20)                           FD00810
        WRITE (IO,180) LINE1,LINE2,LINE3                                FD00820
        WRITE (IO,190) NAVG,IPOLU,IDATE,NB                              FD00830
C***WRITE LAST PAGE AND TOTALS***                                       FD00840
        WRITE (IO,200) (I,I=21,NSIGP)                                   FD00850
        WRITE (IO,210)                                                  FD00860
        WRITE (IO,220) (NPS(I),I=21,NSIGP)                              FD00870
        WRITE (IO,230)                                                  FD00880
        DO 100 K=1,NRECEP                                               FD00890
        WRITE (IO,240) K,(PSIGS(K,I),I=21,NSIGP)                        FD00900
100     WRITE (IO,250) PSIGS(K,26),PCHI(K)                              FD00910
C***                                                                    FD00920
C***WRITE AREA SOURCE TABLE                                             FD00930
110     IF (IOPT(2).EQ.0) GO TO 130                                     FD00940
        WRITE (IO,180) LINE1,LINE2,LINE3                                FD00950
        WRITE (IO,270) NAVG,IPOLU,IDATE,NB                              FD00960
        WRITE (IO,200) (I,I=1,NSIGA)                                    FD00970
        WRITE (IO,280)                                                  FD00980
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      WRITE (IO,220) (MAS(I),I=1,NSIGA)                                 FD00990
      WRITE (IO,230)                                                    FD01000
      DO 120 K=1,NRECEP                                                 FD01010
      WRITE (IO,240) K,(ASIGS(K,I),I=1,NSIGA)                           FD01020
120   WRITE (IO,250) ASIGS(K,11),ACHI(K)                                FD01030
C***                                                                    FD01040
C***OUTPUT SUMMARY TABLE                                                FD01050
C***                                                                    FD01060
130   WRITE (IO,180) LINE1,LINE2,LINE3                                  FD01070
      WRITE (IO,290) NAVG,IPOLU,IDATE,NB                                FD01080
      WRITE (IO,300)                                                    FD01090
C***CALCULATE GRAND TOTALS AND RANK CONCENTRATIONS                      FD01100
      DO 150 I=1,NRECEP                                                 FD01110
      CMAX=-1.0                                                         FD01120
      DO 140 K=1,NRECEP                                                 FD01130
      IF (GRANDT(K).LE.CMAX) GO TO 140                                  FD01140
      CMAX=GRANDT(K)                                                    FD01150
      LMAX=K                                                            FD01160
140   CONTINUE                                                          FD01170
      IRANK(LMAX)=I                                                     FD01180
      GRANDT(LMAX)=-1.0                                                 FD01190
150   CONTINUE                                                          FD01200
      DO 160 K=1,NRECEP                                                 FD01210
      C1=RREC(K)*UNITS                                                  FD01220
      C2=SREC(K)*UNITS                                                  FD01230
      WRITE (IO,310) K,ITYPE(K),ICODE(K),C1,C2,PSIGS(K,26),PCHI(K),ASIGS FD01240
     1(K,11),ACHI(K),GRANDS(K),IRANK(K)                                 FD01250
160   CONTINUE                                                          FD01260
C***WRITE DAILY CONC. TO DISK/TAPE                                      FD01270
      WRITE(13) IDATE(2),(GRANDS(I),I=1,NRECEP)                         FD01280
C***SAVE DAILY MAXIMUMS                                                 FD01290
      DO 169 K=1,NRECEP                                                 FD01300
      ANNSUM(K)=ANNSUM(K)+GRANDS(K)                                     FD01310
      IF(GRANDS(K).LE.DMAX(1,5,K)) GO TO 169                            FD01320
C***CONCENTRATION IS ONE OF THE TOP 5                                   FD01330
      DO 162 J=1,5                                                      FD01340
      IF(GRANDS(K).GT.DMAX(1,J,K)) GO TO 166                            FD01350
162   CONTINUE                                                          FD01360
      WRITE(IO,163)                                                     FD01370
163   FORMAT(' ERROR IN FINDING DMAX')                                  FD01380
      GO TO 169                                                         FD01390
C***INSERT IN PROPER POSITION                                           FD01400
166   IF(J.EQ.5) GO TO 168                                              FD01410
      DO 167 IJ=4,J,-1                                                  FD01420
      IJP1=IJ+1                                                         FD01430
      DMAX(1,IJP1,K)=DMAX(1,IJ,K)                                       FD01440
167   DMAX(2,IJP1,K)=DMAX(2,IJ,K)                                       FD01450
168   DMAX(1,J,K)=GRANDS(K)                                             FD01460
      DMAX(2,J,K)=IDATE(2)                                              FD01470
169   CONTINUE                                                          FD01480
      RETURN                                                            FD01490
C                                                                       FD01500
180   FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                        FD01510
190   FORMAT ('0',T22,I2,'-HOUR AVERAGE ',A4,' CONTRIBUTION(MICROGRAMS/M FD01520
     1**3) FROM SIGNIFICANT POINT SOURCES',5X,I2,'/',I3,'  START HOUR: ' FD01530
     2,I2//1X,T5,'RANK')                                                FD01540
200   FORMAT ('+',T12,10(I3,7X))                                        FD01550
210   FORMAT ('+',T113,'TOTAL     TOTAL'/1X,T113,'SIGNIF    ALL POINT'/1 FD01560
     1X,T113,'POINT     SOURCES'/1X,'SOURCE #')                         FD01570
220   FORMAT ('+',T12,10(I3,7X))                                        FD01580
230   FORMAT (1X,'RECEP #')                                             FD01590
240   FORMAT (1X,T3,I3,1X,6P10F10.3)                                    FD01600
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250   FORMAT ('+',T109,6P2F10.3)                                          FD01610
260   FORMAT (1X,'SOURCE #',T12,10(I3,7X))                                FD01620
270   FORMAT ('0',T22,I2,'-HOUR AVERAGE ',A4,' CONTRIBUTION(MICROGRAMS/M FD01630
     1**3) FROM SIGNIFICANT AREA SOURCES',5X,I2,'/',I3,'  START HOUR: ', FD01640
     2I2//1X,T5,'RANK')                                                  FD01650
280   FORMAT ('+',T113,'TOTAL     TOTAL'/1X,T113,'SIGNIF    ALL AREA'/1X FD01660
     1,T113,'AREA      SOURCES'/1X,'SOURCE #')                           FD01670
290   FORMAT ('0',T25,I2,'-HOUR AVERAGE ',A4,' SUMMARY CONCENTRATION TAB FD01680
     1LE(MICROGRAMS/M**3)',5X,I2,'/',I3,'  START HOUR: ',I2//1X)         FD01690
300   FORMAT (1X,'RECEPTOR NO.   EAST     NORTH     ',2X,5('TOTAL FROM  FD01700
     1'),'CONCENTRATION'/1X,T36,'SIGNIF POINT  ALL POINT   SIGNIF AREA  FD01710
     2 ALL AREA     ALL SOURCES',5X,'RANK'/1X,T38,4('SOURCES',6X)//1X)  FD01720
310   FORMAT (1X,T3,I3,1X,A1,I3,6X,F7.2,2X,F7.2,1X,6P5F13.4,6X,I3)       FD01730
C                                                                        FD01740
      END                                                                FD01750
```

DESCRIPTION OF HOURLY OUTPUT FILE

RAMFHOUR

RAMFHOUR IS AN EXAMPLE PROGRAM WHICH READS THE HOURLY CONCENTRATION TAPE PRODUCED BY RAMF OR RAMFR. IT IS GIVEN HERE ONLY AS AN EXAMPLE OF HOW THE HOURLY CONCENTRATION TAPE MAY BE READ.

***** PROGRAM LISTING *****

```
C***READ HOURLY CONCENTRATION TAPE PRODUCED BY RAMF OR RAMFR
C***ASG TAPE TO UNIT 12
      DIMENSION GRANDS(150),RREC(150),SREC(150),LINE1(14),LINE2(14),
     *LINE3(14)
      READ(12) NDAYS,LINE1,LINE2,LINE3
      READ(12) NRECEP,(RREC(I),I=1,NRECEP),(SREC(J),J=1,NRECEP)
      WRITE(6,10) LINE1,LINE2,LINE3
10    FORMAT('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)
      WRITE(6,11) (I,RREC(I),SREC(I),I=1,NRECEP)
11    FORMAT(//1X,T5,'RECEPTOR LOCATIONS'/1X,40(I2,2F10.2/1X))
C***READ NO. OF DAYS TO PRINTOUT
      READ(5,12) IDAY
12    FORMAT(I3)
      WRITE(6,13)
13    FORMAT('1',T30,'HOURLY CONCENTRATIONS(MICROGRAMS/M**3)')
C***READ HOURLY CONCENTRATIONS
      DO 30 I=1,IDAY
      DO 20 J=1,24
      READ(12,END=99) IDAY1,LH,(GRANDS(K),K=1,NRECEP)
      WRITE(6,100) IDAY1,LH,(GRANDS(K),K=1,NRECEP)
100   FORMAT(1X,'JULIAN DAY=',I5,' HOUR= ',I2/1X,4(6P10F11.2/1X))
20    CONTINUE
30    CONTINUE
99    CALL EXIT
      END
```

***** CARD INPUT TO RAMFHOUR *****

```
CARD 1 (I3) IDAY
C       IDAY IS THE NUMBER OF DAYS TO BE USED.
 EXAMPLE:
365


 *****EXAMPLE RUN STREAM*****


@RUN,D/R  JOBNAME,ACCNT-NO/USERID.,PROJ-ID,1,10
@PASSWD PASSWORD
@ASG,A RAMFHOUR.
@ASG,T/R RAMHOUR.,16N,REEL-NO                  . PROGRAM FILE
@USE 12, RAMHOUR                               . HOURLY OUTPUT FILE
@XQT RAMFHOUR.GO
365


 ***** FORMAT DESCRIPTION OF THE HOURLY CONCENTRATION FILE *****


  EACH OF THE RECORDS IS UNFORMATTED AND FORTRAN WRITTEN.

HEADER RECORD

  VARIABLE                  DESCRIPTION
  --------                  -----------

  NDAYS                     TOTAL NUMBER OF DAYS PROCESSED
  LINE1                     80 CHARACTER TITLE AS INPUT TO RAMF
  LINE2                     80 CHARACTER TITLE AS INPUT TO RAMF
  LINE3                     80 CHARACTER TITLE AS INPUT TO RAMF

RECEPTOR LOCATION RECORD

  VARIABLE                  DESCRIPTION
  --------                  -----------

  NRECEP                    NUMBER OF RECEPTORS
  RREC(I),I=1,NRECEP        EAST COORDINATE OF ALL RECEPTORS(USER UNITS)
  SREC(I),I=1,NRECEP        NORTH COORDINATE OF ALL RECEPTORS(USER UNITS)

HOURLY CONCENTRATION RECORDS(ONE FOR EACH HOUR)

  VARIABLE                  DESCRIPTION
  --------                  -----------

  IDAY1                     JULIAN DAY
  LH                        HOUR
  GRANDS(K),K=1,NRECEP      1-HOUR CONCENTRATION OF EACH RECEPTOR
                              (GRAMS/M**3)

NOTE: SCALING TO MICROGRAMS/M**3 IS DONE WITH OUTPUT FORMAT.


        DESCRIPTION OF DAILY OUTPUT FILE
```

RAMFDAY

RAMFDAY IS AN EXAMPLE PROGRAM WHICH READS THE DAILY CONCENTRATION DISK PRODUCED BY RAMF OR RAMFR. IT IS GIVEN HERE ONLY AS AN EXAMPLE OF HOW THE DAILY CONCENTRATION DISK FILE CAN BE READ. THIS WRITE-UP ASSUMES THE AVERAGING TIME TO BE 24 HOURS. IF A DIFFERENT AVERAGING TIME WERE USED ADJUSTMENTS TO THIS PROGRAM WOULD BE NECESSARY SINCE THERE WOULD BE A CONCENTRATION RECORD FOR EACH AVERAGING PERIOD INSTEAD OF FOR EACH 24-HOUR PERIOD(DAY).

***** PROGRAM LISTING *****

```
C***READ DAILY CONCENTRATION DISK PRODUCED BY RAMF OR RAMFR
C***ASG TAPE TO UNIT 13
      DIMENSION GRANDS(150),RREC(150),SREC(150),LINE1(14),LINE2(14),
     *LINE3(14)
      READ(13) NDAYS,LINE1,LINE2,LINE3
      READ(13) NRECEP,(RREC(I),I=1,NRECEP),(SREC(J),J=1,NRECEP)
      WRITE(6,10) LINE1,LINE2,LINE3
10    FORMAT('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)
      WRITE(6,11) (I,RREC(I),SREC(I),I=1,NRECEP)
11    FORMAT(//1X,T5,'RECEPTOR LOCATIONS'/1X,40(I2,2F10.2/1X))
C***READ NO. OF DAYS TO PRINTOUT
      READ(5,12) IDAY
12    FORMAT(I3)
      WRITE(6,13)
13    FORMAT('1',T30,'DAILY CONCENTRATIONS(MICROGRAMS/M**3)')
C***READ DAILY CONCENTRATIONS
      DO 30 I=1,IDAY
      READ(13,END=99) IDAY1,(GRANDS(K),K=1,NRECEP)
      WRITE(6,100) IDAY1,(GRANDS(K),K=1,NRECEP)
100   FORMAT(1X,'JULIAN DAY=',I5,/1X,4(6P10F11.2/1X))
30    CONTINUE
99    CALL EXIT
      END
```

*****CARD INPUT TO RAMFDAY *****

CARD 1 (I3) IDAY
IDAY IS THE NUMBER OF DAYS TO BE READ
EXAMPLE:

```
365
```

*****EXAMPLE RUN STREAM*****

```
@RUN,D/R JOBNAME,ACCNT-NO/USERID.,PROJ-ID,1,10
@PASSWD PASSWORD
@ASG,A RAMFDAY,      . PROGRAM FILE
@ASG,A RAM24.        . DAILY OUTPUT FILE FROM RAMF OR RAMFR
@USE 13,RAM24.
@XQT RAMFDAY.CO
365
```

***** FORMAT DESCRIPTION OF THE DAILY CONCENTRATION FILE *****

EACH OF THE RECORDS IS UNFORMATTED AND FORTRAN WRITTEN.

HEADER RECORD

VARIABLE	DESCRIPTION
NDAYS	TOTAL NUMBER OF DAYS PROCESSED
LINE1	80 CHARACTER TITLE AS INPUT TO RAMF
LINE2	80 CHARACTER TITLE AS INPUT TO RAMF
LINE3	80 CHARACTER TITLE AS INPUT TO RAMF

RECEPTOR LOCATION RECORD

VARIABLE	DESCRIPTION
NRECEP	NUMBER OF RECEPTORS
RREC(I),I=1,NRECEP	EAST COORDINATE OF ALL RECEPTORS(USER UNITS)
SREC(I),I=1,NRECEP	NORTH COORDINATE OF ALL RECEPTORS(USER UNITS)

DAILY CONCENTRATION RECORDS(ONE FOR EACH AVERAGING PERIOD, I.E. DAY)

VARIABLE	DESCRIPTION
IDAY1	JULIAN DAY
GRAMS(K),K=1,NRECEP	24-HOUR CONCENTRATION AT EACH RECEPTOR(GRAMS/M**3)

NOTE: SCALING TO MICROGRAMS/M**3 IS DONE WITH OUTPUT FORMAT.

```
C***   RURAL BATCH VERSION(78124) OF RAMR                                    RMR0010
C***RAM IS AN EFFICIENT GAUSSIAN-PLUME MULTIPLE-SOURCE                       RMR0020
C***AIR QUALITY ALGORITHM. RAM IS DESCRIBED IN: NOVAK,J.H., AND              RMR0030
C***TURNER,D.B., 1976: AIR POLLUTION CONTROL ASSOC. J.. VOL. 26. NO. 6,      RMR0040
C***PAGES 570-575(JUNE 1976). RAM'S PRINCIPAL USE IS TO DETERMINE            RMR0050
C***SHORT TERM(ONE-HOUR TO ONE-DAY) CONCENTRATIONS FROM POINT AND            RMR0060
C***AREA SOURCES IN URBAN AREAS.                                             RMR0070
C***SEE RAM GLOSSARY FOR DEFINITIONS OF VARIABLES.                           RMR0080
C***                                                                         RMR0090
C***           POINT SOURCE INFORMATION                                      RMR0100
C***                                                                         RMR0110
C***SOURCE(9,#PT SOURCES)      1=EAST CO-ORD(USER UNITS)                     RMR0120
C***                           2=NORTH CO-ORD(USER UNITS)                    RMR0130
C***                           3=SO2 EMISSION RATE(G/SEC)                    RMR0140
C***                           4=PART EMISSION RATE(G/SEC)                   RMR0150
C***                           5=STACK HEIGHT(M)                             RMR0160
C***                           6=STACK TEMP(K)                               RMR0170
C***                           7=STACK DIAM(M)                               RMR0180
C***                           8=STACK VELOCITY(M/S)                         RMR0190
C***                           9=PARTIAL CALCULATION OF BUOYANCY             RMR0200
C***PNAME             12 CHARACTER PLANT IDENTIFICATION                      RMR0210
C***           AREA SOURCE INFORMATION                                       RMR0220
C***ASORC(6,#AREA SOURCES)  1=X CO-ORD(USER UNITS), SOUTHWEST CORNER         RMR0230
C***                        2=Y CO-ORD(USER UNITS), SOUTHWEST CORNER         RMR0240
C***                        3=SO2 EMISSION RATE(G/SEC)                       RMR0250
C***                        4=PART EMISSION RATE(G/SEC)                      RMR0260
C***                        5=SIDE LENGTH(USER UNITS)                        RMR0270
C***                        6=STACK HEIGHT(M)                                RMR0280
      COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),AXCO     RMR0290
     1F(6,9),AXEXP(6,9),HC1(10)                                              RMR0300
      COMMON /RELC/ CIN(3,200)                                               RMR0310
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR     RMR0320
     1EC(150),SREC(150),NPS(25),NAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S     RMR0330
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)      RMR0340
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA     RMR0350
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR     RMR0360
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)      RMR0370
      COMMON /HEIGHT/ HINT(3),HARE(3),BPHH(2),FH                             RMR0380
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE     RMR0390
     1(2)                                                                    RMR0400
      COMMON /HCORID/ HRMIN,HRMAX,HSMIN,HSMAX                                RMR0410
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                        RMR0420
      DIMENSION IFREQ(7), DEG(3), HSAV(250), PNAME(2,50), DUMR(24), HLH(     RMR0430
     12,24), LINE1(14), LINE2(14), LINE3(14), MODEL(2), DSAV(250), IMPS(     RMR0440
     225), IMAS(10), URREC(150), USREC(150), TITLE(2)                        RMR0450
      DATA IFREQ /7*0/ ,DEG /90.,180.,270./ ,ICHAR /'1'/                     RMR0460
      DATA PL/0.07,0.07,0.10,0.15,0.35,0.55/                                 RMR0470
      DATA MODEL /'RURAL ','URBAN '/ ,TITLE /' SO2  ',' PART '/              RMR0480
      NRECEP=0                                                               RMR0490
      NPREC=0                                                                RMR0500
      NP=0                                                                   RMR0510
      IN=5                                                                   RMR0520
      IO=6                                                                   RMR0530
```

```
C***NID-DISK OR TAPE INPUT OF PREPROCESSED EMISSION DATA. LIMITED TO:      RMR0540
C***150 RECEPTORS,250 POINT SOURCES AND 100 AREA SOURCES                   RMR0550
C***NIP-DISK OUTPUT OF PARTIAL CONCENTRATIONS AT EACH RECEPTOR             RMR0560
C***NIT-DISK INPUT OF MET DATA                                             RMR0570
C***UNIT 15 - TAPE/DISK INPUT OF HOURLY POINT SOURCE EMISSIONS             RMR0580
C***UNIT 16 - TAPE/DISK INPUT OF HOURLY AREA SOURCE EMISSIONS              RMR0590
      NID=9                                                                RMR0600
      NIP=10                                                               RMR0610
      NIT=11                                                               RMR0620
C***THREE SYSTEMS OF LENGTH AND COORDINATES ARE USED IN RAM:               RMR0630
C***  THE FIRST SYSTEM, USER UNITS, IS SELECTED BY THE USER AND            RMR0640
C***   NORMALLY USE THE COORDINATE SYSTEM OF THE EMISSION INVENTORY.       RMR0650
C***   ALL LOCATIONS INPUT BY THE USER(SUCH AS SOURCES AND RECEPTORS)      RMR0660
C***   ARE IN THIS SYSTEM. ALSO AS A CONVENIENCE TO THE USER ALL           RMR0670
C***   LOCATIONS ON OUTPUT ARE ALSO IN THIS SYSTEM.                        RMR0680
C***  THE SECOND SYSTEM, INTERNAL UNITS, IS USED INTERNALLY IN RAM         RMR0690
C***   FOR COORDINATE LOCATIONS AND DISTANCES. ONE INTERNAL UNIT IS THE    RMR0700
C***   SIDE LENGTH OF THE SMALLEST AREA SOURCE SQUARE. THIS LENGTH MUST    RMR0710
C***   BE IDENTIFIED AND SPECIFIED BY THE USER. THE PURPOSE OF USING       RMR0720
C***   INTERNAL UNITS IS TO HAVE A CORRESPONDENCE BETWEEN LOCATION(GRID    RMR0730
C***   COORDINATES) AND PARTICULAR AREA SOURCE POSITIONS. THIS IS          RMR0740
C***   ACCOMPLISHED THROUGH THE USE OF THE AREA SOURCE MAP ARRAY(IA ARRAY  RMR0750
C***   ). THIS ALLOWS DETERMINATION AS TO WITHIN WHICH AREA SOURCE ANY     RMR0760
C***   COORDINATE POINT RESIDES.                                           RMR0770
C***  THE THIRD SYSTEM,X,Y, IS AN UPWIND, CROSSWIND COORDINATE SYSTEM      RMR0780
C***   WITH REFERENCE TO EACH RECEPTOR. THE X-AXIS IS DIRECTED UPWIND      RMR0790
C***   (SAME AS WIND DIRECTION FOR THE PERIOD). IN ORDER TO DETERMINE      RMR0800
C***   DISPERSION PARAMETER VALUES AND EVALUATE EQUATIONS FOR              RMR0810
C***   CONCENTRATIONS, DISTANCES IN THIS SYSTEM MUST BE IN KILOMETERS.     RMR0820
C***                                                                       RMR0830
C***READ CARDS 1-3, IDENTIFICATION FOR TITLES.                             RMR0840
      READ (IN,940) LINE1,LINE2,LINE3                                      RMR0850
      WRITE (IO,950) LINE1,LINE2,LINE3                                     RMR0860
C***MODL IS INDICATOR FOR RURAL VERSION                                    RMR0870
      MODL=1                                                               RMR0880
      WRITE (IO,960)                                                       RMR0890
C***READ RAMQ OUTPUT FROM DISK OR TAPE; DATA IN INTERNAL UNITS.            RMR0900
      READ (NID) UNITS,CONTWO,CONONE,IPOL,NPT,IMPS,PNAME,IMOD              RMR0910
C***VERSION COMPATIBLE WITH RAMQ OUTPUT?                                   RMR0920
      IF (IMOD.EQ.MODL) GO TO 10                                           RMR0930
      WRITE (IO,1000) MODEL(IMOD),MODEL(MODL)                              RMR0940
      CALL EXIT                                                            RMR0950
C***CONTINUE READING DATA TRANSFERRED FROM RAMQ.                           RMR0960
10    DO 20 I=1,9                                                          RMR0970
20    READ (NID) (SOURCE(I,J),J=1,NPT)                                     RMR0980
      READ (NID) NAS,IMAS,RMIN,RMAX,SMIN,SMAX,IRSIZE,ISSIZE                RMR0990
      DO 30 I=1,6                                                          RMR1000
30    READ (NID) (ASORC(I,J),J=1,NAS)                                      RMR1010
      DO 40 I=1,IRSIZE                                                     RMR1020
40    READ (NID) (IA(I,J),J=1,ISSIZE)                                      RMR1030
C***                                                                       RMR1040
C***READ CARD 4.                                                           RMR1050
C***OPTION LIST***(SEE RUN STREAM EXAMPLES OF RAM FOR DETAILED             RMR1060
C***DESCRIPTION OF INPUT VARIABLES).                                       RMR1070
C***NAVG IS INTERMEDIATE AVERAGING TIME IN HOURS                           RMR1080
C***HAFL IS POLLUTANT HALF-LIFE IN SECONDS                                 RMR1090
      READ (IN,970) IOPT,NPER,NAVG,Z,HAFL,NSIGP,NSIGA,IDATE,IHSTRT        RMR1100
      WRITE (IO,1030) (I,IOPT(I),I=1,13)                                   RMR1110
      TLOS=693./HAFL                                                       RMR1120
C***693. = 0.693*1000 METERS/KM, TLOS IN METERS/KM-SEC.                    RMR1130
      IF (NAVG.EQ.0) CALL EXIT                                             RMR1140
C***READ SFC MET. STATION ID AND 2-DIGIT YEAR,                             RMR1150
```

```
C***MIXING HEIGHT STATION AND 2-DIGIT YEAR                                      RMR1160
C***ONLY IF MET DATA IS FROM RAMMET                                             RMR1170
      IF (IOPT(11).EQ.1) GO TO 60                                               RMR1180
C***READ CARD TYPE 5 UNLESS USING OPTION 11.                                    RMR1190
      READ (IN,970) ISFCD,ISFCYR,IMXD,IMXYR                                     RMR1200
C***THE ABOVE FORMAT IS UNIVACS FREE FIELD INPUT.                               RMR1210
C***VARIABLES MUST BE SEPARATED BY COMMAS.                                      RMR1220
C***THIS IS SIMILAR TO IBM'S LIST DIRECTED IO.                                  RMR1230
C***CHECK TO INSURE CORRECT SURFACE DATA, MIXING HT. DATA, AND                  RMR1240
C***PREPROCESSOR ARE BEING USED.                                                RMR1250
C***READ IDENTIFICATION RECORD FROM PREPROCESSED MET DISK OR TAPE FILE          RMR1260
      READ (NIT) ID,IYEAR,IDM,IYM                                               RMR1270
      IF (ISFCD.EQ.ID.AND.ISFCYR.EQ.IYEAR) GO TO 50                             RMR1280
      WRITE (IO,980) ISFCD,ISFCYR,ID,IYEAR                                      RMR1290
      CALL EXIT                                                                 RMR1300
50    IF (IMXD.EQ.IDM.AND.IMXYR.EQ.IYM) GO TO 60                                RMR1310
      WRITE (IO,990) IMXD,IMXYR,IDM,IYM                                         RMR1320
      CALL EXIT                                                                 RMR1330
60    IP=IPOL-2                                                                 RMR1340
      WRITE (IO,780) UNITS,CONONE,CONTWO,TITLE(IP),IPOL                         RMR1350
C***ECHO INPUT PARAMETERS                                                       RMR1360
      WRITE (IO,790) NPER,NAVG,IDATE(2),IDATE(1),IHSTRT,Z,HAFL                  RMR1370
      IF (IOPT(11).EQ.0) WRITE (IO,800) ISFCD,ISFCYR,IMXD,IMXYR                 RMR1380
      WRITE (IO,810)                                                            RMR1390
C***IOPT(1) CONTROL OPTION, POINT SOURCE INPUT? 0=NO, 1=YES.                    RMR1400
C***IF NO POINT SOURCES, SKIP DOWN TO AREA SOURCE CODE.                         RMR1410
      IF (IOPT(1).EQ.0) GO TO 150                                               RMR1420
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCE NUMBERS           RMR1430
C***0=NO, 1=YES.                                                                RMR1440
      IF (IOPT(12).EQ.0) GO TO 80                                               RMR1450
C***READ CARD TYPE 6 IF USING OPTIONS 1 AND 12.                                 RMR1460
C***READ THE NUMBER OF SIGNIFICANT POINT SOURCES THAT USER WANTS TO             RMR1470
C***SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.                       RMR1480
      READ (IN,870) INPT,(INPS(I),I=1,INPT)                                     RMR1490
      IF (INPT.EQ.0) GO TO 80                                                   RMR1500
      IF (INPS(INPT).EQ.0) WRITE (IO,880)                                       RMR1510
      J=INPT+1                                                                  RMR1520
      K=1                                                                       RMR1530
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST             RMR1540
C***IF NSIGP GREATER THAN INPT.                                                 RMR1550
      IF (J.GT.NSIGP) GO TO 100                                                 RMR1560
      DO 70 I=J,NSIGP                                                           RMR1570
      INPS(I)=INPS(K)                                                           RMR1580
70    K=K+1                                                                     RMR1590
      GO TO 100                                                                 RMR1600
80    DO 90 I=1,NSIGP                                                           RMR1610
90    NPS(I)=INPS(I)                                                            RMR1620
100   WRITE (IO,950) LINE1,LINE2,LINE3                                          RMR1630
      WRITE (IO,820) NPT,NSIGP,(INPS(I),I=1,NSIGP)                              RMR1640
      WRITE (IO,1050)                                                           RMR1650
      IF (IOPT(13).EQ.0) GO TO 120                                              RMR1660
C***SAVE AVERAGE EMISSION RATE                                                  RMR1670
      DO 110 I=1,NPT                                                            RMR1680
110   PSAV(I)=SOURCE(IPOL,I)                                                    RMR1690
C***WRITE OUT POINT SOURCE LIST.                                                RMR1700
120   DO 130 I=1,NPT                                                            RMR1710
C***CONVERT TO USER UNITS FOR PRINT OUT.                                        RMR1720
      C1=SOURCE(1,I)*UNITS                                                      RMR1730
      C2=SOURCE(2,I)*UNITS                                                      RMR1740
      WRITE (IO,1060) I,(PNAME(L,I),L=1,2),C1,C2,(SOURCE(K,I),K=3,6)            RMR1750
      IPSIGS(I)=0                                                               RMR1760
130   CONTINUE                                                                  RMR1770
```

```
C***FILL IN SIGNIFICANT POINT SOURCE ARRAY                              RMR1780
      DO 140 I=1,NSIGP                                                  RMR1790
      J=NPS(I)                                                          RMR1800
140   IPSIGS(J)=I                                                       RMR1810
C***IOPT(2) CONTROL OPTION, AREA SOURCE INPUT? 0=NO, 1=YES.             RMR1820
C***IF NO AREA SOURCES, SKIP DOWN TO INPUTTING RECEPTORS.               RMR1830
150   IF (IOPT(2).EQ.0) GO TO 260                                       RMR1840
C***READ CARD TYPE 7 IF USING OPTION 2.                                 RMR1850
      READ (IN,970) FH,XLIM,NHTS,(HINT(I),I=1,NHTS)                     RMR1860
      NBP=NHTS-1                                                        RMR1870
      IF (NBP.LE.0) NBP=1                                               RMR1880
C***READ CARD TYPE 8 IF USING OPTION 2.                                 RMR1890
      READ (IN,970) (BPH(I),I=1,NBP)                                    RMR1900
C***CONVERT TO USER UNITS FOR PRINT OUT. XLIM IS CONVERTED TO KM.       RMR1910
      C1=RMIN*UNITS                                                     RMR1920
      C2=RMAX*UNITS                                                     RMR1930
      C3=SMIN*UNITS                                                     RMR1940
      C4=SMAX*UNITS                                                     RMR1950
      C5=XLIM                                                           RMR1960
      WRITE (IO,950) LINE1,LINE2,LINE3                                  RMR1970
      XLIM=XLIM*CONONE                                                  RMR1980
      IF (XLIM.LT.116.) GO TO 160                                       RMR1990
      WRITE (IO,1040) XLIM                                              RMR2000
      CALL EXIT                                                         RMR2010
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCES? 0=NO,   RMR2020
C***  1=YES.                                                            RMR2030
160   IF (IOPT(12).EQ.0) GO TO 190                                      RMR2040
C***READ THE NUMBER OF SIGNIFICANT AREA SOURCES THAT USER               RMR2050
C***WANTS TO SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.      RMR2060
C***READ CARD TYPE 9 IF USING OPTIONS 2 AND 12.                         RMR2070
      READ (IN,870) INAS,(NAS(I),I=1,INAS)                              RMR2080
      IF (INAS.EQ.0) GO TO 180                                          RMR2090
      IF (NAS(INAS).EQ.0) WRITE (IO,890)                                RMR2100
      J=INAS+1                                                          RMR2110
      K=1                                                               RMR2120
      IF (J.GT.NSIGA) GO TO 200                                         RMR2130
      DO 170 I=J,NSIGA                                                  RMR2140
      NAS(I)=INAS(K)                                                    RMR2150
170   K=K+1                                                             RMR2160
      GO TO 200                                                         RMR2170
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST     RMR2180
C***IF NSIGA GREATER THAN INAS.                                         RMR2190
180   DO 190 I=1,NSIGA                                                  RMR2200
190   NAS(I)=INAS(I)                                                    RMR2210
200   WRITE (IO,830) NAS,NSIGA,(INAS(I),I=1,NSIGA)                      RMR2220
      WRITE (IO,840) NHTS,(HINT(I),I=1,NHTS)                            RMR2230
      WRITE (IO,850) (BPH(I),I=1,NBP)                                   RMR2240
      WRITE (IO,860) FH,C5,C1,C2,C3,C4,IRSIZE,ISSIZE                    RMR2250
C***IF IA ARRAY TOO LARGE TO BE PRINTED AS A MAP, PRINTING IS SKIPPED.  RMR2260
      IF (IRSIZE.GT.41) GO TO 220                                       RMR2270
C***PRINT OUT AREA SOURCE MAP ARRAY.                                    RMR2280
      WRITE (IO,1010)                                                   RMR2290
      JLIM=ISSIZE+1                                                     RMR2300
      DO 210 JDUM=1,ISSIZE                                              RMR2310
      J=JLIM-JDUM                                                       RMR2320
210   WRITE (IO,1020) J,(IA(I,J),I=1,IRSIZE)                            RMR2330
      WRITE (IO,1190) (I,I=1,IRSIZE)                                    RMR2340
      GO TO 230                                                         RMR2350
220   WRITE (IO,930)                                                    RMR2360
C***WRITE OUT THE AREA SOURCE LIST.                                     RMR2370
230   WRITE (IO,1070)                                                   RMR2380
      DO 240 I=1,NAS                                                    RMR2390
```

```
C***CONVERT TO USER UNITS FOR PRINT OUT                                    RMR2400
      C1=ASORC(1,I)*UNITS                                                  RMR2410
      C2=ASORC(2,I)*UNITS                                                  RMR2420
      C3=ASORC(5,I)*UNITS                                                  RMR2430
      WRITE (IO,1080) I,C1,C2,(ASORC(K,I),K=3,4),C3,ASORC(6,I)             RMR2440
C***SIDE LENGTH IS MULTIPLIED BY .5 TO SAVE TIME IN LATER COMPUTATIONS     RMR2450
      ASORC(5,I)=ASORC(5,I)*0.5                                            RMR2460
      IASIGS(I)=0                                                          RMR2470
240   CONTINUE                                                             RMR2480
C***FILL IN SIGNIFICANT AREA SOURCE MARKER ARRAY                           RMR2490
      DO 250 I=1,NSIGA                                                     RMR2500
      J=MAS(I)                                                             RMR2510
250   IASIGS(J)=I                                                          RMR2520
C***INPUT PERMANENT RECEPTORS                                              RMR2530
C***IOPT(3) CONTROL OPTION, SPECIFIED RECEPTORS?  0 = NO, 1 = YES.         RMR2540
260   IF (IOPT(3).EQ.0) GO TO 300                                          RMR2550
270   NRECEP=NRECEP+1                                                      RMR2560
      IF (NRECEP.GT.150) GO TO 280                                         RMR2570
C***READ COORDINATES IN USER UNITS                                         RMR2580
C***ATTENTION USER: DON'T SPECIFY A RECEPTOR AT ORIGIN AS A BLANK CARD     RMR2590
C***IS USED TO INDICATE ALL RECEPTORS HAVE BEEN READ.                      RMR2600
C***READ CARD TYPE 10 IF USING OPTION 3.                                   RMR2610
      READ (IN,1090) (RNAME(J,NRECEP),J=1,2),RREC(NRECEP),SREC(NRECEP)     RMR2620
C***BLANK CARD OR RECEPTOR AT ORIGIN SIGNALS ALL PERMANENT RECEPTORS        RMR2630
C***HAVE BEEN ENTERED.                                                     RMR2640
      IF (RREC(NRECEP)+SREC(NRECEP).LE.0.001) GO TO 280                    RMR2650
      GO TO 270                                                            RMR2660
280   NRECEP=NRECEP-1                                                      RMR2670
C***SAVE NUMBER OF PERMANENT RECEPTORS                                     RMR2680
      NPREC=NRECEP                                                         RMR2690
C***PRINT OUT TABLE OF PERMANENT RECEPTORS***                              RMR2700
      WRITE (IO,950) LINE1,LINE2,LINE3                                     RMR2710
      WRITE (IO,1100)                                                      RMR2720
C***THE CHARACTER "I" INDICATES THAT THESE RECEPTORS WERE INPUT INTO        RMR2730
C***THE MODEL.                                                             RMR2740
      DO 290 K=1,NRECEP                                                    RMR2750
      ITYPE(K)=ICHAR                                                       RMR2760
      WRITE (IO,1110) K,ITYPE(K),(RNAME(J,K),J=1,2),RREC(K),SREC(K)        RMR2770
C***CONVERT TO INTERNAL UNITS                                              RMR2780
      RREC(K)=RREC(K)/UNITS                                                RMR2790
      SREC(K)=SREC(K)/UNITS                                                RMR2800
290   ICODE(K)=0                                                           RMR2810
C***IF NEITHER POINT OR AREA SOURCES WERE SPECIFIED,EXIT PROGRAM.          RMR2820
300   IF ((IOPT(1)+IOPT(2)).NE.0) GO TO 310                                RMR2830
      WRITE (IO,1120)                                                      RMR2840
      CALL EXIT                                                            RMR2850
310   IDAY=IDATE(2)-1                                                      RMR2860
C***IOPT(11) CONTROL OPTION, INPUT MET DATA ON CARDS?  0=NO, 1=YES.        RMR2870
      IF (IDAY.LT.0.OR.IOPT(11).EQ.1) GO TO 330                            RMR2880
C***POSITION MET FILE TO CORRECT POSITION                                  RMR2890
      DO 320 I=1,IDAY                                                      RMR2900
320   READ (MET) JYR                                                       RMR2910
C***IOPT(6) CONTROL OPTION, FILL IN HONEYCOMB RECEPTORS? 0=NO, 1=YES.      RMR2920
330   IF (IOPT(6).EQ.0) GO TO 360                                          RMR2930
C***READ IN SPACING BETWEEN HONEYCOMB RECEPTORS AND VARIABLE HONEYCOMB     RMR2940
C***GRID BOUNDARIES IN USER UNITS.                                         RMR2950
C***USER CAN INPUT ZERO HERE FOR BOUNDARIES IF HE WANTS THE BOUNDARIES     RMR2960
C***OF THE AREA SOURCE REGION TO DEFINE THE AREA COVERED BY HONEYCOMB       RMR2970
C***RECEPTORS.                                                             RMR2980
C***READ CARD TYPE 11 IF USING OPTION 6.                                   RMR2990
      READ (IN,970) GRIDSP,HRMIN,HRMAX,HSMIN,HSMAX                        RMR3000
      IF (HRMAX.NE.0.0) GO TO 340                                          RMR3010
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C***RMIN,RMAX,SMIN,SMAX ARE IN INTERNAL UNITS                          RMR3020
      HRMIN=RMIN                                                       RMR3030
      HRMAX=RMAX                                                       RMR3040
      HSMIN=SMIN                                                       RMR3050
      HSMAX=SMAX                                                       RMR3060
      GO TO 350                                                        RMR3070
C***CONVERT INPUT GRID BOUNDARIES(USER UNITS) TO INTERNAL UNITS         RMR3080
340   HRMIN=HRMIN/UNITS                                                RMR3090
      HRMAX=HRMAX/UNITS                                                RMR3100
      HSMIN=HSMIN/UNITS                                                RMR3110
      HSMAX=HSMAX/UNITS                                                RMR3120
C***CONVERT GRIDSP FROM USER UNITS TO INTERNAL UNITS.                   RMR3130
350   GRIDSP=GRIDSP/UNITS                                              RMR3140
C***INITIALIZATION                                                     RMR3150
360   IDAY=IDAY+1                                                      RMR3160
      NHRS=0                                                           RMR3170
      IF (IOPT(11).EQ.1) GO TO 400                                     RMR3180
C***INPUT MET DATA FOR EACH DAY FROM DISK CREATED BY RAMMET,IOPT(11)=0 RMR3190
      READ (MET) JYR,IMO,DAY1,IKST,QU,QTEMP,DUMR,QTHETA,HLH            RMR3200
      IF (JYR.NE.IDATE(1)) GO TO 370                                   RMR3210
      IDATE(2)=DAY1                                                    RMR3220
      IF (IDATE(2).EQ.IDAY) GO TO 380                                  RMR3230
C***DATE ON MET TAPE DOES NOT MATCH INTERNAL DATE                      RMR3240
370   WRITE (IO,740) JYR,IDATE(2),IDATE(1),IDAY                        RMR3250
      CALL EXIT                                                        RMR3260
C***MODIFY WIND VECTOR BY 180 DEGREES. SINCE FLOW VECTORS WERE OUTPUT  RMR3270
C***FROM RAMMET, THIS CONVERTS BACK TO WIND DIRECTIONS.                RMR3280
380   DO 390 IQ=1,24                                                   RMR3290
      IF (IKST(IQ).EQ.7) IKST(IQ)=6                                    RMR3300
      QTHETA(IQ)=QTHETA(IQ)+180.                                       RMR3310
      IF (QTHETA(IQ).GT.360.) QTHETA(IQ)=QTHETA(IQ)-360.               RMR3320
C***RURAL MIXING HEIGHTS ARE USED FOR THIS APPLICATION                 RMR3330
390   QHL(IQ)=HLH(1,IQ)                                                RMR3340
400   NB=IHSTRT                                                        RMR3350
      NE=NB+NAVG-1                                                     RMR3360
      IF (NB.GT.0) GO TO 410                                           RMR3370
      WRITE (IO,750) IHSTRT                                            RMR3380
      CALL EXIT                                                        RMR3390
410   WRITE (IO,950) LINE1,LINE2,LINE3                                 RMR3400
      U=0.0                                                            RMR3410
      TEMP=0.0                                                         RMR3420
      DELH=0.0                                                         RMR3430
      DELH=0.0                                                         RMR3440
      DO 420 I=1,7                                                     RMR3450
420   IFREQ(I)=0.0                                                     RMR3460
C***EACH AVERAGING PERIOD, THE NUMBER OF RECEPTORS IS RESET TO THE     RMR3470
C***NUMBER OF PERMANENT RECEPTORS.                                     RMR3480
      NRECEP=NPREC                                                     RMR3490
      DO 440 I=NB,NE                                                   RMR3500
      JHR=I                                                            RMR3510
      IF (IOPT(11).EQ.0) GO TO 430                                     RMR3520
C***READ MET DATA FROM CARDS WITH FREE FORMAT                          RMR3530
C***READ CARD TYPE 12 IF USING OPTION 11 ; JHR REDEFINED FROM METCARD. RMR3540
      READ (IR,970) JYR,DAY1,JHR,IKST(JHR),QU(JHR),QTEMP(JHR),QTHETA(JHR RMR3550
     1),QHL(JHR)                                                       RMR3560
      IF (I.NE.NB) GO TO 430                                           RMR3570
      IDATE(1)=JYR                                                     RMR3580
      IHSTRT=JHR                                                       RMR3590
      ISTDAY=DAY1                                                      RMR3600
      IDATE(2)=ISTDAY                                                  RMR3610
430   IF(I.EQ.NB) WRITE (IO,1130) IDATE                                RMR3620
      TRAD=QTHETA(JHR)*0.01745329                                      RMR3630
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      IF(IRST(JHR).EQ.7) IRST(JHR)=6                                    RMR3640
      WRITE (IO,1140) JHR,QTHETA(JHR),QU(JHR),QUL(JHR),QTEMP(JHR),IRST(J RMR3650
     1HR)                                                               RMR3660
      SINT=SIN(TRAD)                                                    RMR3670
      COST=COS(TRAD)                                                    RMR3680
C***CALCULATE WIND COMPONENTS                                           RMR3690
      URES=QU(JHR)                                                      RMR3700
      UR=URES*SINT                                                      RMR3710
      VR=URES*COST                                                      RMR3720
      DELM=DELM+UR                                                      RMR3730
      DELN=DELN+VR                                                      RMR3740
      TEMP=TEMP+QTEMP(JHR)                                              RMR3750
      U=U+URES                                                          RMR3760
      IRST=IRST(JHR)                                                    RMR3770
440   IFREQ(IRST)=IFREQ(IRST)+1                                         RMR3780
C***REDEFINE NB AND NE IN CASE NON-CONSECUTIVE DAYS ARE BEING RUN       RMR3790
      IF(IOPT(11).EQ.0) GO TO 441                                       RMR3800
      NB=INSTRT                                                         RMR3810
      NE=INSTRT+NAVG-1                                                  RMR3820
C***CALCULATE RESULTANT  WIND DIRECTION THETA                           RMR3830
441   DELM=DELM/NAVG                                                    RMR3840
      DELN=DELN/NAVG                                                    RMR3850
      THETA=ARCTAN(DELM,DELN)                                           RMR3860
C***CALCULATE AVERAGE AND RESULTANT SPEED                               RMR3870
      U=U/NAVG                                                          RMR3880
      TEMP=TEMP/NAVG                                                    RMR3890
      URES=SQRT(DELM*DELM+DELN*DELN)                                    RMR3900
      PERSIS=URES/U                                                     RMR3910
C***DETERMINE MODAL AND AVERAGE STABILITY                               RMR3920
      LSMAX=0                                                           RMR3930
      DO 450 I=1,7                                                      RMR3940
      LST=IFREQ(I)                                                      RMR3950
      IF (LST.LE.LSMAX) GO TO 450                                       RMR3960
      LSMAX=LST                                                         RMR3970
      LSTAB=I                                                           RMR3980
450   CONTINUE                                                          RMR3990
      IP1=LSTAB+1                                                       RMR4000
      KST=LSTAB                                                         RMR4010
      DO 460 I=IP1,7                                                    RMR4020
      IF (LSMAX.EQ.IFREQ(I)) GO TO 470                                  RMR4030
460   CONTINUE                                                          RMR4040
      GO TO 490                                                         RMR4050
C***IF TIE FOR MAX MODAL STABILITY CALCULATE AVERAGE STABILITY          RMR4060
470   KSUM=0                                                            RMR4070
      DO 480 J=1,7                                                      RMR4080
480   KSUM=KSUM+IFREQ(J)*J                                              RMR4090
      KST=FLOAT(KSUM)/FLOAT(NAVG)+0.5                                   RMR4100
C***OUTPUT RESULTANT MET CONDITIONS***                                  RMR4110
490   WRITE (IO,1150)                                                   RMR4120
      WRITE (IO,1160) THETA,URES,U,TEMP,PERSIS,KST                      RMR4130
      TRAD=THETA*0.01745329                                             RMR4140
      SINT=SIN(TRAD)                                                    RMR4150
      COST=COS(TRAD)                                                    RMR4160
C***DETERMINE RECEPTORS ACCORDING TO SIGNIFICANT SOURCES                RMR4170
C***IOPT(4)  CONTROL OPTION, SIGNIFICANT POINT RECEPTORS?    0=NO, 1=YES. RMR4180
C***IOPT(5)  CONTROL OPTION, SIGNIFICANT AREA RECEPTORS?     0=NO, 1=YES. RMR4190
      IF ((IOPT(4)+IOPT(5)).EQ.0) GO TO 500                             RMR4200
      CALL JHHREC                                                       RMR4210
C***FILL IN RECEPTORS WITH HONEYCOMB ARRAY                              RMR4220
C***IOPT(6) CONTROL OPTION, FILL IN HONEYCOMB RECEPTORS? 0 = NO, 1 = YES RMR4230
500   IF (IOPT(6).EQ.0) GO TO 510                                       RMR4240
      C1=HRMIN*UNITS                                                    RMR4250
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      C2=HRMAX*UNITS                                                    RMR4260
      C3=HSMIN*UNITS                                                    RMR4270
      C4=HSMAX*UNITS                                                    RMR4280
      C5=GRIDSP*UNITS                                                   RMR4290
      WRITE (IO,1170) C1,C2,C3,C4,C5                                    RMR4300
      CALL JMRMOM (GRIDSP)                                              RMR4310
510   IF (NRECEP.NE.0) GO TO 520                                        RMR4320
      WRITE (IO,1180)                                                   RMR4330
      CALL EXIT                                                         RMR4340
C***INITIALIZE CONCENTRATION SUMS                                       RMR4350
C***IF SIGNIFICANT OR HONEYCOMB RECEPTORS,WRITE CAUTIONING STATEMENT.   RMR4360
520   IF ((IOPT(4)+IOPT(5)+IOPT(6)).GT.0) WRITE (IO,900)                RMR4370
C***INITIALIZE FOR AVERAGING TIME                                       RMR4380
      DO 550 K=1,NRECEP                                                 RMR4390
      ACHI(K)=0.0                                                       RMR4400
      PCHI(K)=0.0                                                       RMR4410
      DO 530 I=1,11                                                     RMR4420
530   ASIGS(K,I)=0.0                                                    RMR4430
      DO 540 I=1,26                                                     RMR4440
540   PSIGS(K,I)=0.0                                                    RMR4450
550   CONTINUE                                                          RMR4460
C***IF SAVING PARTIAL CONCENTRATIONS, WRITE NOS. OF RECEPTORS  SOURCES. RMR4470
      IF (IOPT(3).EQ.0) GO TO 570                                       RMR4480
      DO 560 I=1,NRECEP                                                 RMR4490
      URREC(I)=RREC(I)*UNITS                                            RMR4500
      USREC(I)=SREC(I)*UNITS                                            RMR4510
560   CONTINUE                                                          RMR4520
      WRITE (MIP) NRECEP,NAS,NPT,(URREC(I),I=1,NRECEP),(USREC(I),I=1,NRE RMR4530
     1CEP)                                                              RMR4540
C***                                                                    RMR4550
C***LOOP ON HOURS                                                       RMR4560
C***                                                                    RMR4570
570   DO 700 ILH=NE,NE                                                  RMR4580
      LH=ILH                                                            RMR4590
      IF (LH.LE.24) GO TO 580                                           RMR4600
      LH=MOD(ILH,24)                                                    RMR4610
      IF (LH.EQ.1) IDATE(2)=DAY1                                        RMR4620
C***INITIALIZE HOURLY ARRAYS                                            RMR4630
580   DO 610 K=1,NRECEP                                                 RMR4640
      AHCHI(K)=0.0                                                      RMR4650
      PHCHI(K)=0.0                                                      RMR4660
      DO 590 I=1,11                                                     RMR4670
590   AHSIGS(K,I)=0.0                                                   RMR4680
      DO 600 I=1,26                                                     RMR4690
600   PHSIGS(K,I)=0.0                                                   RMR4700
610   CONTINUE                                                          RMR4710
C***SET MET CONDITIONS FOR THIS HOUR***                                 RMR4720
      THETA=QTHETA(LH)                                                  RMR4730
      U=QU(LH)                                                          RMR4740
      HL=QHL(LH)                                                        RMR4750
      TEMP=QTEMP(LH)                                                    RMR4760
      KST=IKST(LH)                                                      RMR4770
C***DETERMINE WIND DIRECTION CONTROL, IWD, 90 DEG. QUADRANT OF WIND     RMR4780
C***                                                                    RMR4790
      DO 620 I=1,3                                                      RMR4800
      IF (THETA.LE.DEG(I)) GO TO 630                                    RMR4810
620   CONTINUE                                                          RMR4820
      I=4                                                               RMR4830
630   IWD=I                                                             RMR4840
      TRAD=THETA*0.01745329                                             RMR4850
      SINT=SIN(TRAD)                                                    RMR4860
      COST=COS(TRAD)                                                    RMR4870
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C***CHECK FOR POINT SOURCES                                                    RMR4880
      IF (IOPT(1).NE.1) GO TO 650                                              RMR4890
C***IOPT(13) CONTROL OPTION, HOURLY EMISSIONS INPUT? 0=NO, 1=YES               RMR4900
      IF (IOPT(13).EQ.0) GO TO 640                                             RMR4910
      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                                     RMR4920
C***READ HOURLY POINT SOURCE RECORD                                            RMR4930
      READ (15) IDATP,(SOURCE(IPOL,I),I=1,NPT)                                 RMR4940
C***CHECK DATE                                                                 RMR4950
      IF (IDCK.EQ.IDATP) GO TO 640                                             RMR4960
      WRITE (IO,910) IDCK,IDATP                                                RMR4970
      CALL EXIT                                                                RMR4980
C***CALCULATE POINT SOURCE CONTRIBUTIONS                                       RMR4990
640   CALL JMHPTR (HSAV,DSAV,Z,TLOS,LH)                                        RMR5000
C***CHECK FOR AREA SOURCES                                                     RMR5010
650   IF (IOPT(2).NE.1) GO TO 690                                              RMR5020
C***IOPT(13) CONTROL OPTION, HOURLY EMISSION INPUT? 0=NO, 1=YES                RMR5030
      IF (IOPT(13).EQ.0) GO TO 680                                             RMR5040
      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                                     RMR5050
C***READ HOURLY AREA SOURCE EMISSION RECORD                                    RMR5060
      READ (16) IDATA,(ASOEC(IPOL,I),I=1,NAS)                                  RMR5070
C***CHECK DATE                                                                 RMR5080
      IF (IDCK.EQ.IDATA) GO TO 660                                             RMR5090
      WRITE (IO,920) IDCK,IDATA                                                RMR5100
      CALL EXIT                                                                RMR5110
C***CONVERT HOURLY AREA EMISSIONS FROM G/SEC TO G/SQ. M/SEC                    RMR5120
660   DO 670 I=1,NAS                                                           RMR5130
C***CONVERT SIDE LENGTH TO METERS.                                             RMR5140
C***NOTE: SIDE LENGTH HAD BEEN MULTIPLIED BY .5 ABOVE FOR TIME                 RMR5150
C***CONSIDERATIONS                                                             RMR5160
      SF=ASOEC(5,I)*2000*CONTWO                                                RMR5170
670   ASOEC(IPOL,I)=ASOEC(IPOL,I)/(SF*SF)                                      RMR5180
C***SET UP INTEGRATION TABLES FOR AREA SOURCE CALCULATIONS***                  RMR5190
680   CALL JMH54R (NHTS,Z,XLIM,TLOS)                                           RMR5200
C***CALCULATE AREA SOURCE CONTRIBUTIONS                                        RMR5210
      CALL JMHARE (NHTS,XLIM,LH)                                               RMR5220
C***OUTPUT RESULTS EACH HOUR                                                   RMR5230
C***IOPT(7) CONTROL OPTION, HOURLY OUTPUT? 0 = NO, 1 = YES.                    RMR5240
690   IF (IOPT(7).EQ.0) GO TO 700                                              RMR5250
      CALL JMHOUR (LH,LINE1,LINE2,LINE3)                                       RMR5260
700   CONTINUE                                                                 RMR5270
      IF(NE.GT.24) IDATE(2)=ISTDAY                                             RMR5280
C***OUTPUT FINAL RESULTS                                                       RMR5290
      CALL JMHFIN (NB,LINE1,LINE2,LINE3)                                       RMR5300
      NP=NP+1                                                                  RMR5310
      NHRS=NHRS+NAVG                                                           RMR5320
      IF(NP.GE.NPER) GO TO 720                                                 RMR5330
      IF(NHRS.GE.24) GO TO 360                                                 RMR5340
710   NB=NB+NAVG                                                               RMR5350
      NE=NE+NAVG                                                               RMR5360
      IF(NB.LE.24) GO TO 410                                                   RMR5370
      NB=MOD(NB,24)                                                            RMR5380
      NE=NB+NAVG-1                                                             RMR5390
      GO TO 410                                                                RMR5400
C***IOPT(8) CONTROL OPTION, SOURCE CONTRIBUTIONS TO DISK? 0=NO, 1=YES.         RMR5410
720   IF (IOPT(8).EQ.0) GO TO 730                                              RMR5420
      END FILE NIP                                                             RMR5430
      END FILE NIP                                                             RMR5440
730   CALL EXIT                                                                RMR5450
C                                                                              RMR5460
740   FORMAT (' DATE ON MET. TAPE, ',I2,I3,' ,DOES NOT MATCH INTERNAL DA       RMR5470
     1TE, ',I2,I3)                                                             RMR5480
750   FORMAT (' HOUR ',I3,' IS NOT PERMITTED. HOURS MUST BE DEFINED BETW       RMR5
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     1EEN 1 AND 24')                                                                RMR5500
 780  FORMAT (1X,T21,'GENERAL INFORMATION FROM RAMQ'//2X,'UNITS - THERE              RMR5510
     1ARE',F14.7,' USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUA             RMR5520
     2RE SIDE LENGTH (INTERNAL UNIT)'/2X,'CONONE - THERE ARE',F14.7,' KI             RMR5530
     3LOMETERS PER USER UNIT'/2X,'CONTWO - IT IS CALCULATED THAT THERE A             RMR5540
     4RE',F14.7,' KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH            RMR5550
     5 (INTERNAL UNIT)'/2X,'THIS RUN IS FOR ',A6,'SINCE IPOL=',I2//1X)              RMR5560
 790  FORMAT (1X,T21,'GENERAL INPUT DATA'//2X,'NUMBER OF PERIODS TO BE S             RMR5570
     1IMULATED(NPER)= ',I3/2X,'AVERAGING TIME IN HOURS FOR EACH PERIOD(N            RMR5580
     2AVG)= ',I5/2X,'STARTING DATE(IDATE(2),IDATE(1),IHSTRT): JULIAN DAY            RMR5590
     3 ',I4,', YEAR 19',I2,' HOUR= ',I2/2X,'RECEPTOR HEIGHT FOR ALL RECE           RMR5600
     4PTORS(Z) ',F6.3,' METERS'/2X,'ASSUMED POLLUTANT HALF-LIFE(HAFL) ',            RMR5610
     5F10.2,' SECONDS')                                                             RMR5620
 800  FORMAT (2X,'SURFACE MET DATA FROM STATION(ISFCD) ',I6,', YEAR(ISFC             RMR5630
     1YR) 19',I2/2X,'MIXING HEIGHT DATA FROM STATION(IMXD) ',I6,', YEAR(            RMR5640
     2IMXYR) 19',I2)                                                                RMR5650
 810  FORMAT (//1X)                                                                  RMR5660
 820  FORMAT ('0',T21,'POINT SOURCE INFORMATION'//2X,'EMISSION INFORMATI             RMR5670
     1ON FOR ',I4,' (NPT) POINT SOURCES HAS BEEN DETERMINED BY RAMQ'/2X,            RMR5680
     2I2,' SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN'            RMR5690
     3/2X,'THE ORDER OF SIGNIFICANCE(IMPS) FOR 25 OR LESS POINT SOURCES             RMR5700
     4DETERMINED BY RAMQ IS LISTED BY POINT SOURCE NUMBER:'/2X,25I5)                RMR5710
 830  FORMAT (//1X,T21,'AREA SOURCE INFORMATION'//2X,'EMISSION INFORMATI             RMR5720
     1ON FOR ',I4,' (NAS) AREA SOURCES HAS BEEN DETERMINED BY RAMQ'/2X,I            RMR5730
     22,' SIGNIFICANT AREA SOURCES(NSIGA) ARE TO BE USED FOR THIS RUN'/2            RMR5740
     3X,' THE ORDER OF SIGNIFICANCE(IMAS) FOR 10 OR LESS  AREA SOURCES D            RMR5750
     4ETERMINED BY RAMQ IS LISTED BY  AREA SOURCE NUMBER:'/2X,10I5)                 RMR5760
 840  FORMAT (2X,'NUMBER OF AREA HEIGHT CLASSES(NHTS)=',I2/2X,'REPRESENT            RMR5770
     1ATIVE AREA SOURCE HEIGHTS FOR EACH HEIGHT CLASS(HINT) IN METERS=',            RMR5780
     23F10.2)                                                                       RMR5790
 850  FORMAT (2X,'BREAK POINT HEIGHT BETWEEN THE AREA HEIGHT CLASSES(BPH             RMR5800
     1) IN METERS=',2F10.2)                                                         RMR5810
 860  FORMAT (2X,'FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGH             RMR5820
     1T(FH)=',F10.3/2X,'LIMIT OF DISTANCE FOR AREA SOURCE INTEGRATION TA            RMR5830
     2BLES(XLIM) IN USER UNITS =',F10.3/2X,'BOUNDARIES OF THE AREA SOURC            RMR5840
     3E GRID IN USER UNITS:'/1X,T6,'RMIN=',F10.3,5X,'RMAX=',F10.3,5X,'SM            RMR5850
     4IN=',F10.3,5X,'SMAX=',F10.3/2X,'SIZE(IRSIZE X ISSIZE) OF AREA SOUR            RMR5860
     5CE MAP ARRAY(IA) IN INTERNAL UNITS =',I3,' EAST-WEST BY ',I3,' NOR            RMR5870
     6TH-SOUTH'//1X)                                                                RMR5880
 870  FORMAT (26I3)                                                                  RMR5890
 880  FORMAT (' ***ERROR IN SPECIFYING SIGNIF. POINT SOURCES***')                    RMR5900
 890  FORMAT (' ***ERROR IN SPECIFYING SIGNIF. AREA SOURCES***')                     RMR5910
 900  FORMAT (' ***PLEASE NOTE: THE RECEPTOR NUMBERS AND LOCATIONS GENER             RMR5920
     1ATED FOR THIS AVERAGING TIME PERIOD ARE DIFFERENT FROM THOSE GENER            RMR5930
     2ATED FOR'/18X,' THE PRECEEDING AVERAGING PERIOD.***')                         RMR5940
 910  FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY POINT E             RMR5950
     1MISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')             RMR5960
 920  FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY AREA EM            RMR5970
     1ISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')              RMR5980
 930  FORMAT (' AREA ARRAY IS TOO WIDE FOR PAGE SIZE, THEREFORE WILL NOT             RMR5990
     1 BE PRINTED.')                                                                RMR6000
 940  FORMAT (13A6,A2/13A6,A2/13A6,A2)                                               RMR6010
 950  FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                                     RMR6020
 960  FORMAT('0THIS IS THE NORMAL RURAL VERSION(78124) OF RAMR FOR APPLI             RMR6030
     1CATION TO ONE OR SEVERAL DAYS DATA.'/1X)                                      RMR6040
 970  FORMAT ()                                                                      RMR6050
 980  FORMAT (' SURFACE DATA IDENTIFERS READ INTO MODEL (STATION=',I5,'              RMR6060
     1,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X,            RMR6070
     2' (STATION=',I5,' ,YEAR=',I2)                                                 RMR6080
 990  FORMAT (' MIXING HEIGHT IDENTIFERS READ INTO MODEL (STATION=',I5,'             RMR6090
     1 ,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X            RMR6100
     2,' (STATION=',I5,' ,YEAR=',I2)                                                RMR6110
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1000  FORMAT (' *** THE ',A6,'VERSION OF THE PREPROCESSOR CAN NOT BE USE RMR6120
     1D WITH THE ',A6,'VERSION OF THE MODEL***')                        RMR6130
1010  FORMAT ('0',13X,'AREA SOURCE MAP ARRAY(IA)'/1X)                   RMR6140
1020  FORMAT (1X,I3,2X,41I3/1X)                                         RMR6150
1030  FORMAT (1X,T3,'OPTION  ',T16,'OPTION LIST',T46,'OPTION SPECIFICATI RMR6160
     1ON : 0= IGNORE OPTION'/1X,T68,' 1= USE OPTION'/1X,T7,I2,T16,'POINT RMR6170
     2 SOURCE DATA',T51,I1/1X,T7,I2,T16,'AREA SOURCE DATA',T51,I1/1X,T7, RMR6180
     3I2,T16,'PERMANENT RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT POIN RMR6190
     4T RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT AREA RECEPTORS',T51, RMR6200
     5I1/1X,T7,I2,T16,'HONEYCOMB RECEPTORS',T51,I1/1X,T7,I2,T16,'HOURLY  RMR6210
     6OUTPUT',T51,I1/1X,T7,I2,T16,'PARTIAL CONC. WRITTEN TO DISK/TAPE',T RMR6220
     751,I1/1X,T7,I2,T16,'PRINT ONLY SUMMARY HOURLY OUTPUT',,T51,I1/1X,T RMR6230
     87,I2,T16,'PUNCH CARDS FOR CONTOURS',T51,I1/1X,T7,I2,T16,'READ MET  RMR6240
     9DATA FROM CARDS',T51,I1/1X,T7,I2,T16,'SPECIFY SIGNIFICANT SOURCE N RMR6250
     AUMBERS',T51,I1/1X,T7,I2,T16,'READ HOURLY EMISSIONS',T51,I1/1X)    RMR6260
1040  FORMAT (' THE INPUT LIMIT OF MAX DISTANCE FOR AREA INTEGRATION ',' RMR6270
     1 CONVERTS TO ',F10.3,' KM WHICH EXCEEDS STORAGE ','LIMITATIONS. UP RMR6280
     2  TO 116 KM DISTANCES ARE ALLOWED.')                             RMR6290
1050  FORMAT ('0',T50,'POINT SOURCE LISTING'//1X,T8,'SOURCE',T25,'EAST', RMR6300
     1T33,'NORTH',T40,'SO2(G/SEC)  PART(G/SEC)  STACK  STACK   STACK    RMR6310
     2  STACK'/1X,T25,'COORD',T33,'COORD  EMISSIONS   EMISSIONS    HT(M) RMR6320
     3  TEMP(K) ','DIAM(M) VEL(M/SEC)'/1X,T26,'(USER UNITS)'/1X)        RMR6330
1060  FORMAT (1X,T3,I3,1X,2A6,2X,2F9.2,F10.2,F11.2,2X,4F8.2)            RMR6340
1070  FORMAT (/1X,T20,'AREA SOURCE LISTING'//1X,T2,'SOURCE',T10,'EAST',T RMR6350
     118,'NORTH',T26,'SO2(G/SEC-M**2)',T44,'PART(G/SEC-M**2)  SIDE      RMR6360
     2EFFECTIVE'/1X,T10,'COORD   COORD',T29,'EMISSIONS',T46,'EMISSIONS', RMR6370
     3T61,'LENGTH    HEIGHT'/1X,T11,'(USER UNITS)',T58,'(USER UNITS)',T7 RMR6380
     44,'(M)'/1X)                                                       RMR6390
1080  FORMAT (1X,T3,I3,2X,2F9.1,3X,1PE11.4,7X,1PE11.4,3X,0PF7.1,3X,F7.1) RMR6400
1090  FORMAT (2A4,2F10.3)                                               RMR6410
1100  FORMAT ('0',T9,'INPUT RECEPTORS'//1X,'RECEPTOR    IDENTIFICATION  RMR6420
     1EAST     NORTH    '/1X,T30,'COORD',T39,'COORD'/1X,T31,'(USER UNITS RMR6430
     2)'/1X)                                                            RMR6440
1110  FORMAT (1X,T4,I2,1X,A1,8X,2A4,7X,F6.2,3X,F7.2)                    RMR6450
1120  FORMAT (1X,'NO SOURCES SPECIFIED')                                RMR6460
1130  FORMAT ('0INPUT MET DATA  ',I2,'/',I4/1X,T2,'HOUR   THETA    SPEED RMR6470
     1   MIXING   TEMP     STABILITY'/1X,T9,'(DEG)    (M/S)  HEIGHT(M) ( RMR6480
     2DEG-K)  CLASS'/1X)                                                RMR6490
1140  FORMAT (1X,T3,I2,4F9.2,6X,I1)                                     RMR6500
1150  FORMAT ('0','RESULTANT MET CONDITIONS'/1X)                        RMR6510
1160  FORMAT (2X,'WIND DIRECTION=',F7.2,T36,'RESULTANT WIND SPEED=',F7.2 RMR6520
     1/2X,'AVERAGE WIND SPEED=',F7.2,T36,'AVERAGE TEMP=',F7.2/2X,'WIND P RMR6530
     2ERSISTENCE=',F6.3,T36,'MODAL STABILITY=',I2)                      RMR6540
1170  FORMAT ('0',T20,'GENERATED HONEYCOMB RECEPTORS'/1X,/1X,'THE AREA T RMR6550
     1O BE COVERED BY HONEYCOMB RECEPTORS IS BOUNDED BY:'/1X,' RMIN=',F1 RMR6560
     20.3,' RMAX=',F10.3,' SMIN=',F10.3,' SMAX=',F10.3//1X,'DISTANCE BET RMR6570
     3WEEN HONEYCOMB RECEPTORS(GRIDSP) IN USER UNITS=',F7.3//1X,'RECEPTO RMR6580
     4R    EAST     NORTH')                                             RMR6590
1180  FORMAT (1X,'NO RECEPTORS HAVE BEEN CHOSEN')                       RMR6600
1190  FORMAT (/6X,41I3/1X)                                              RMR6610
C                                                                       RMR6620
      END                                                               RMR6630



      SUBROUTINE JMHPTR (HSAV,DSAV,Z,TLOS,LH)                          PTR0010
C      THE PURPOSE OF THIS ROUTINE IS TO CALCULATE CONCENTRATIONS FROM  PTR0020
C      POINT SOURCES.                                                   PTR0030
C      INPUT VARIABLES ARE...                                           PTR0040
C         HSAV- AN ARRAY OF EFFECTIVE HEIGHTS FOR POINT SOURCES(METERS) PTR0050
C         DSAV-AN ARRAY OF DISTANCES TO FINAL RISE(KM)                  PTR0060
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C          Z- RECEPTOR HEIGHT.                                                  PTR0070
C          TLOS- PARTIAL COMPUTATION RELATED TO POLLUTANT LOSS.                 PTR0080
C          IDATE- YEAR AND JULIAN DAY(IN COMMON/METDAT/)                        PTR0090
C          LH- HOUR                                                             PTR0100
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR       PTR0110
     1EC(150),SREC(150),NPS(25),NAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S       PTR0120
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PHASE(2,250),PSAV(250)        PTR0130
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA       PTR0140
     1SIGS(100),IPSIGS(250),THETA,U,EST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR       PTR0150
     2TC(250),ANCHI(150),PNCHI(150),ANSIGS(150,11),PNSIGS(150,26),PL(6)        PTR0160
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE       PTR0170
     1(2)                                                                      PTR0130
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                          PTR0190
      DIMENSION HSAV(NPT), DSAV(250), UPH(250), HPR(250), FP(250)              PTR0200
C***                                                                           PTR0210
C***                                                                           PTR0220
C***ZERO EFFECTIVE STACK HEIGHT FOR EACH SOURCE                                PTR0230
C***                                                                           PTR0240
      DO 10 J=1,NPT                                                            PTR0250
10    HSAV(J)=0.0                                                              PTR0260
C***LOOP ON RECEPTORS***                                                       PTR0270
      DO 120 K=1,NRECEP                                                        PTR0280
C***                                                                           PTR0290
C***CALCULATE CONCENTRATIONS FROM POINT SOURCES***                             PTR0300
C***     LOOP ON POINT SOURCES                                                 PTR0310
C***                                                                           PTR0320
      DO 110 J=1,NPT                                                           PTR0330
      PARTC(J)=0.0                                                             PTR0340
      RQ=SOURCE(1,J)                                                           PTR0350
      SQ=SOURCE(2,J)                                                           PTR0360
C***DETERMINE UPWIND DISTANCE                                                  PTR0370
C***XDUM,YDUM IN INTERNAL UNITS. X,Y IN KM.                                    PTR0380
      XDUM=RQ-RREC(K)                                                          PTR0390
      YDUM=SQ-SREC(K)                                                          PTR0400
      X=(YDUM*COST+XDUM*SINT)*CONTWO                                           PTR0410
C*** X IS THE UPWIND DISTANCE  OF THE SOURCE FROM THE RECEPTOR.                PTR0420
C***IF X IS NEGATIVE, INDICATING THAT THE SOURCE IS DOWNWIND OF                PTR0430
C***THE RECEPTOR, THE CALCULATION IS TERMINATED ASSUMING NO                    PTR0440
C***CONTRIBUTION FROM THAT SOURCE.                                             PTR0450
      IF (X.LE.0.0) GO TO 110                                                  PTR0460
C***                                                                           PTR0470
C***DETERMINE CROSSWIND DISTANCE                                               PTR0480
C***                                                                           PTR0490
      Y=(YDUM*SINT-XDUM*COST)*CONTWO                                           PTR0500
      HF=HSAV(J)                                                               PTR0510
C***SKIP PLUME RISE CALCULATION IF EFFECTIVE HEIGHT HAS ALREADY BEEN           PTR0520
C***   CALCULATED FOR THIS SOURCE                                             PTR0530
      IF (HF.GT.0.0) GO TO 80                                                  PTR0540
C*** MODIFY WIND SPEED BY POWER LAW PROFILE IN ORDER TO TAKE INTO               PTR0550
C***ACCOUNT THE INCREASE OF WIND SPEED WITH HEIGHT.                            PTR0560
C***ASSUME WIND MEASUREMENTS ARE REPRESENTATIVE FOR A 10 METER HEIGHT.         PTR0570
      THT=SOURCE(5,J)                                                          PTR0580
C***POINT SOURCE HEIGHT NOT ALLOWED TO BE LESS THAN 1 METER.                   PTR0590
      IF (THT.LT.1.) THT=1.                                                    PTR0600
      UPL=U*(THT/10.)**PL(KST)                                                 PTR0610
C***WIND SPEED NOT ALLOWED TO BE LESS THAN 1 METER/SEC.                        PTR0620
      IF (UPL.LT.1.) UPL=1.                                                    PTR0630
      UPH(J)=UPL                                                               PTR0640
      VS=SOURCE(8,J)                                                           PTR0650
      BUOY=SOURCE(9,J)                                                         PTR0660
      TS=SOURCE(6,J)                                                           PTR0670
      DELT=TS-TEMP                                                             PTR0680
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      F=BUOY*DELT/TS                                                    PTR0690
C*** IOPT(13) HOURLY EMISSION INPUT FROM TAPE/DISK?  0=NO, 1=YES.       PTR0700
      IF (IOPT(13).EQ.0) GO TO 20                                       PTR0710
C***MODIFY EXIT VELOCITY AND BUOYANCY BY RATIO OF HOURLY EMISSIONS       PTR0720
C***TO AVERAGE EMISSIONS                                                PTR0730
      SCALE=SOURCE(IPOL,J)/PSAV(J)                                      PTR0740
      VS=VS*SCALE                                                       PTR0750
      F=F*SCALE                                                         PTR0760
20    D=SOURCE(7,J)                                                     PTR0770
C***CALCULATE  H PRIME WHICH TAKES INTO ACCOUNT STACK DOWNWASH           PTR0780
C***BRIGGS(1973) PAGE 4                                                 PTR0790
      HPRM=THT                                                          PTR0800
      DUM=VS/UPL                                                        PTR0810
      IF (DUM.LT.1.5) HPRM=THT+2.*D*(DUM-1.5)                           PTR0820
      IF (HPRM.LT.0.) HPRM=0.                                           PTR0830
C***                                                                    PTR0840
C***CALCULATE PLUME RISE AND ADD H PRIME TO OBTAIN EFFECTIVE            PTR0850
C***STACK HEIGHT.                                                       PTR0860
C***                                                                    PTR0870
C***PLUME RISE CALCULATION                                              PTR0880
      IF (KST.GT.4) GO TO 40                                            PTR0890
C***PLUME RISE FOR UNSTABLE CONDITIONS                                  PTR0900
      IF (TS.LT.TEMP) GO TO 50                                          PTR0910
      IF (F.GE.55.) GO TO 30                                            PTR0920
C***DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F<55)             PTR0930
C***FOUND BY EQUATING BRIGGS(1969) EQ 5.2, PAGE 59 WITH COMBINATION OF  PTR0940
C***BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.                 PTR0950
      DTHB=0.0297*TS*VS**0.33333/D**0.66667                             PTR0960
      IF (DELT.LT.DTHB) GO TO 50                                        PTR0970
C***DISTANCE OF FINAL BUOYANT RISE(0.049 IS 14*3.5/1000)                PTR0980
C***BRIGGS(1971) EQUATION 7,F<55, AND DIST TO FINAL RISE IS 3.5 XSTAR   PTR0990
      DISTF=0.049*F**0.625                                              PTR1000
C***COMBINATION OF BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.  PTR1010
      HF=HPRM+21.425*F**0.75/UPL                                        PTR1020
      GO TO 70                                                          PTR1030
C***DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F>55)             PTR1040
C***FOUND BY EQUATING BRIGGS(1969) EQ 5.2, PAGE 59 WITH COMBINATION OF  PTR1050
C*** BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.                PTR1060
30    DTHB=0.00575*TS*VS**0.66667/D**0.33333                            PTR1070
      IF (DELT.LT.DTHB) GO TO 50                                        PTR1080
C***DISTANCE OF FINAL BUOYANT RISE (0.119 IS 34*3.5/1000)               PTR1090
C***BRIGGS(1971) EQUATION 7, F>55, AND DIST TO FINAL RISE IS 3.5 XSTAR. PTR1100
      DISTF=0.119*F**0.4                                                PTR1110
C***COMBINATION OF BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.  PTR1120
      HF=HPRM+38.71*F**0.6/UPL                                          PTR1130
      GO TO 70                                                          PTR1140
C***PLUME RISE FOR STABLE CONDITIONS.                                   PTR1150
40    DTHDZ=0.02                                                        PTR1160
      IF (KST.GT.5) DTHDZ=0.035                                         PTR1170
      S=9.80616*DTHDZ/TEMP                                              PTR1180
      IF (TS.LT.TEMP) GO TO 60                                          PTR1190
C***DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(STABLE)           PTR1200
C***FOUND BY EQUATING BRIGGS(1975) EQ 59, PAGE 96 FOR STABLE BUOYANCY   PTR1210
C***RISE WITH BRIGGS(1969) EQ 4.28, PAGE 59 FOR STABLE MOMENTUM RISE.   PTR1220
      DTHB=0.019582*TEMP*VS*SQRT(S)                                     PTR1230
      IF (DELT.LT.DTHB) GO TO 60                                        PTR1240
C***STABLE BUOYANT RISE FOR WIND CONDITIONS.(WIND NOT ALLOWED LOW       PTR1250
C***ENOUGH IN RAM TO REQUIRE STABLE RISE IN CALM CONDITIONS.)           PTR1260
C***BRIGGS(1975) EQ 59, PAGE 96.                                        PTR1270
      HF=HPRM+2.6*(F/(UPL*S))**0.333333                                 PTR1280
C***COMBINATION OF BRIGGS(1975) EQ 48 AND EQ 59. NOTE DISTF IN KM.      PTR1290
      DISTF=0.0020715*UPL/SQRT(S)                                       PTR1300
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      GO TO 70                                                          PTR1310
C***UNSTABLE-NEUTRAL MOMENTUM RISE                                      PTR1320
C***BRIGGS(1969) EQUATION 5.2, PAGE 59 NOTE: MOST ACCURATE WHEN VS/U>4; PTR1330
C***TENDS TO OVERESTIMATE RISE WHEN VS/U<4 (SEE BRIGGS(1975) PAGE 78,   PTR1340
C*** FIGURE 4.)                                                         PTR1350
50    HF=HPRM+3.*VS*D/UPL                                               PTR1360
      DISTF=0.                                                          PTR1370
      GO TO 70                                                          PTR1380
C***STABLE MOMENTUM RISE                                                PTR1390
60    DHA=3.*VS*D/UPL                                                   PTR1400
C***BRIGGS(1969) EQUATION 4.28, PAGE 59                                 PTR1410
      DELHF=1.5*(VS*VS*D*D*TEMP/(4.*TS*UPL))**0.333333/S**0.166667      PTR1420
      IF (DHA.LT.DELHF) DELHF=DHA                                       PTR1430
      HF=HPRM+DELHF                                                     PTR1440
      DISTF=0.                                                          PTR1450
C***STORE OFF PLUME HEIGHT(ETC.) FOR THIS SOURCE FOR USE WITH           PTR1460
C***OTHER RECEPTORS.                                                    PTR1470
70    HSAV(J)=HF                                                        PTR1480
      DSAV(J)=DISTF                                                     PTR1490
      UPH(J)=UPL                                                        PTR1500
      HPR(J)=HPRM                                                       PTR1510
      FP(J)=F                                                           PTR1520
C***IF SOURCE-RECEPTOR DISTANCE IS GREATER OR EQUAL TO DISTANCE TO FINAL PTR1530
C***SKIP PLUME RISE CALCULATION AND USE FINAL RISE.                     PTR1540
80    IF (X.GE.DSAV(J)) GO TO 90                                        PTR1550
C***PLUME RISE FOR DISTANCE X(160 IS 1.6*1000**.67 BECAUSE X IN KM)     PTR1560
      HX=HPR(J)+160.*FP(J)**0.333333*X**0.666667/UPH(J)                 PTR1570
      IF (HX.LT.HF) HF=HX                                               PTR1580
C***SUBROUTINE DBTRCR RETURNS THE DISPERSION PARAMTERS,SY AND SZ(METERS) PTR1590
C***AND RELATIVE CONCENTRATION VALUE CHI/Q (SEC/M**3)                   PTR1600
90    UPL=UPH(J)                                                        PTR1610
      CALL DBTRCR (UPL,Z,HF,HL,X,Y,KST,SY,SZ,PROD)                      PTR1620
C***CALCULATE TRAVEL TIME IN KM-SEC/M TO INCLUDE DECAY RATE OF POLLUTANT PTR1630
      TT=X/UPL                                                          PTR1640
C***TLOS IN METERS/KM-SEC, SO TT*TLOS IS DIMENSIONLESS                  PTR1650
      PROD=PROD*SOURCE(IPOL,J)/EXP(TT*TLOS)                             PTR1660
C***INCREMENT CONCENTRATION AT K-TH RECEPTOR(G/M**3)                    PTR1670
      PCHI(K)=PCHI(K)+PROD                                              PTR1680
      PHCHI(K)=PHCHI(K)+PROD                                            PTR1690
      KSIG=IPSIGS(J)                                                    PTR1700
      IF (KSIG.EQ.0) GO TO 100                                          PTR1710
C***STORE CONCENTRATIONS FROM SIGNIFICANT SOURCES.(G/M**3)              PTR1720
      PSIGS(K,KSIG)=PSIGS(K,KSIG)+PROD                                  PTR1730
      PHSIGS(K,KSIG)=PHSIGS(K,KSIG)+PROD                                PTR1740
      PSIGS(K,26)=PSIGS(K,26)+PROD                                      PTR1750
      PHSIGS(K,26)=PHSIGS(K,26)+PROD                                    PTR1760
100   PARTC(J)=PROD                                                     PTR1770
110   CONTINUE                                                          PTR1780
C***END OF LOOP FOR SOURCES                                             PTR1790
C***WRITE PARTIAL CONCENTRATIONS ON DISK(G/M**3)                        PTR1800
      IF (IOPT(8).EQ.0) GO TO 120                                       PTR1810
C***USER PLEASE NOTE: PARTIAL CONC. IN G/M**3, NOT MICROGRAM/M**3       PTR1820
      WRITE (NIP) IDATE,LH,K,(PARTC(J),J=1,NPT)                         PTR1830
120   CONTINUE                                                          PTR1840
C***END OF LOOP FOR RECEPTORS                                           PTR1850
      RETURN                                                            PTR1860
C                                                                       PTR1870
      END                                                               PTR1880
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      SUBROUTINE JMH54R (NHTS,Z,XLIM,TLOS)                              54R0010
C***THE PURPOSE OF THIS ROUTINE IS TO CALCULATE TABLES OF               54R0020
C***CONCENTRATION NORMALIZED FOR WIND SPEED AND EMISSION RATE           54R0030
C***FROM AREA SOURCES (CHI*U/Q). SUBROUTINE JMHCZR IS CALLED FOR        54R0040
C***INTEGRATION OF RELATIVE CONCENTRATION.                              54R0050
C      INPUT VARIABLES ARE...                                           54R0060
C          HINT- REPRESENTATIVE HEIGHTS FOR AREA SOURCES                54R0070
C          NHTS- NUMBER OF HEIGHT CLASSES                               54R0080
C          Z- RECEPTOR HEIGHT(M)                                        54R0090
C          XLIM- DISTANCE LIMIT ON INTEGRATION OF AREA SOURCES(KM)       54R0100
C          TLOS- PARTIAL COMPUTATION RELATED TO POLLUTANT LOSS          54R0110
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA 54R0120
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR 54R0130
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)  54R0140
      COMMON /HEIGHT/ HINT(3),HARE(3),BPHM(2),FH                        54R0150
      COMMON /RELC/ CIN(3,200)                                          54R0160
C***CONCENTRATION TABLES ARE GENERATED FOR UP TO 3 HEIGHTS.             54R0170
      DO 190 IH=1,NHTS                                                  54R0180
      H=HINT(IH)                                                        54R0190
      HARE(IH)=H                                                        54R0200
      IF (FH.EQ.1.) GO TO 10                                            54R0210
      PHT=FH*H                                                          54R0220
      UPL=U*(PHT/10.)**PL(KST)                                          54R0230
      IF (UPL.LT.1.) UPL=1.                                             54R0240
      H=((H-PHT)*5.)/UPL+PHT                                            54R0250
      HARE(IH)=H                                                        54R0260
      GO TO 20                                                          54R0270
C***MODIFY WIND SPEED BY POWER LAW PROFILE.                             54R0280
10    IF (H.LT.1.0) H=1.0                                               54R0290
      UPL=U*(H/10.)**PL(KST)                                            54R0300
      IF (UPL.LT.1.0) UPL=1.0                                           54R0310
C***ZERO CONCENTRATION ARRAY                                            54R0320
20    DO 30 J=1,200                                                     54R0330
30    CIN(IH,J)=0.0                                                     54R0340
      N=0                                                               54R0350
      NC=10                                                             54R0360
      CP=0.0                                                            54R0370
      CI=0.0                                                            54R0380
      JD=1                                                              54R0390
C***DISTANCE IN KM.                                                     54R0400
      X=0.0                                                             54R0410
      DELX=0.001                                                        54R0420
      ID=1                                                              54R0430
40    CL=CP                                                             54R0440
      X=X+DELX                                                          54R0450
C***SUBROUTINE JMHCZR DETERMINES THE RELATIVE CONCENTRATION AT          54R0460
C***VARYING DOWNWIND DISTANCES.                                         54R0470
      CALL JMHCZR (Z,H,X,SZ,CP)                                         54R0480
C***CALCULATE TRAVEL TIME IN KM-SEC/M.                                  54R0490
      TT=X/UPL                                                          54R0500
C***ADJUST RELATIVE CONCENTRATION BY POLLUTANT DECAY RATE.              54R0510
C***TLOS IN METERS/KM-SEC, SO TT*TLOS IS DIMENSIONLESS.                 54R0520
      CP=CP/EXP(TT*TLOS)                                                54R0530
C***INTEGRATED RELATIVE CONCENTRATION IS DIMENSIONLESS.                 54R0540
C***MULTIPLICATION BY 500. CONVERTS TO METERS AND DIVIDES BY 2.         54R0550
      CI=500.*DELX*(CL+CP)+CI                                           54R0560
      GO TO (50,90,120,150,180), JD                                     54R0570
C***NORMALIZED CONCENTRATIONS ARE STORED IN TABLES FOR VARYING          54R0580
C***DISTANCES AT VARYING TIME INTERVALS. THE FOLLOWING COMMENTS DETAIL  54R0590
C***THE TABLE'S CONSTRUCTION.                                           54R0600
C***DISTANCE<100M; CALCULATE EVERY 1 M,  STORE EVERY 10 M, 0.01KM.      54R0610
50    IF (X-0.0993) 60,80,80                                            54R0620
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 60     N=N+1                                                                  54R0630
        IF (N.LT.NC) GO TO 40                                                  54R0640
        N=0                                                                    54R0650
 70     ID=(100.*X)+0.0008                                                     54R0660
C***STORAGE LOCATIONS 1-9 CONTAIN INTEGRATIONS FOR 10-90 M.                    54R0670
        CIN(IH,ID)=CI                                                          54R0680
        GO TO 40                                                               54R0690
C***DISTANCE 100-500M: CHANGE DELX TO 10M; STORE EVERY 10 M, 0.01KM.           54R0700
 80     JD=2                                                                   54R0710
        DELX=0.01                                                              54R0720
        GO TO 70                                                               54R0730
C***STORAGE LOCATIONS 10-49 CONTAIN INTEGRATIONS FOR 100 M TO 490 M.           54R0740
 90     IF (X-0.497) 70,100,100                                                54R0750
C*** DISTANCE 500 -3000M; CHANGE DELX TO 100 M; STORE EVERY 100 M, 0.1KM       54R0760
 100    JD=3                                                                   54R0770
        DELX=0.1                                                               54R0780
 110    ID=(10.*X)+45.08                                                       54R0790
C***STORAGE LOCATIONS 50-74 CONTAIN INTEGRATIONS FOR 500 M TO 2900 M.          54R0800
        CIN(IH,ID)=CI                                                          54R0810
        GO TO 40                                                               54R0820
 120    IF (X-2.95) 110,130,130                                                54R0830
C*** DISTANCE 3000- 15,000M. ; CHANGE DELX TO 500 M; STORE EVERY 500 M,        54R0840
C*** 0.5KM.                                                                    54R0850
 130    JD=4                                                                   54R0860
        DELX=.5                                                                54R0870
 140    ID=(2.*X)+69.08                                                        54R0880
C***STORAGE LOCATIONS 75-98 CONTAIN INTEGRATIONS FOR 3000 M TO 14.5 KM.        54R0890
        CIN(IH,ID)=CI                                                          54R0900
        GO TO 40                                                               54R0910
 150    IF (X-14.95) 140,160,160                                               54R0920
C*** DISTANCE >15,000M.; CHANGE DELX TO 1000M; STORE EVERY 1000 M, 1KM.        54R0930
 160    JD=5                                                                   54R0940
        DELX=1.                                                                54R0950
 170    ID=X+84.08                                                             54R0960
C***STORAGE LOCATIONS 99-200 CONTAIN INTEGRATIONS FOR 15 KM TO A               54R0970
C***MAXIMUM OF 116 KM.                                                         54R0980
        CIN(IH,ID)=CI                                                          54R0990
        GO TO 40                                                               54R1000
 180    IF (X-XLIH) 170,190,190                                                54R1010
 190    CONTINUE                                                               54R1020
        RETURN                                                                 54R1030
C                                                                              54R1040
        END                                                                    54R1050
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      SUBROUTINE JMHCZR (Z,H,X,SZ,RCZ)                                         CZR0010
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA       CZR0020
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IWD,PAR       CZR0030
     2TC(250),AHCHI(150),PHCHI(150),AHSIGS(150,11),PHSIGS(150,26),PL(6)        CZR0040
C         SUBROUTINE JMHCZR CALCULATES CHI*U/Q, RELATIVE CONCENTRATION         CZR0050
C          NORMALIZED FOR WIND SPEED AND EMISSION RATE, FOR A CROSSWIND        CZR0060
C            INFINTE SOURCE UPWIND OF A RECEPTOR (IN UNITS OF: PER METER       CZR0070
C         JMHCZR CALLS SUBROUTINE PGSZ                                         CZR0080
C         THE INPUT VARIABLES ARE....                                          CZR0090
C          Z     RECEPTOR HEIGHT (M)                                           CZR0100
C          H     EFFECTIVE STACK HEIGHT (M)                                    CZR0110
C          HL    MIXING HEIGHT- TOP OF NEUTRAL OR UNSTABLE LAYER(M)            CZR0120
C                 (THROUGH COMMON/METCON/)                                     CZR0130
C          X     DISTANCE  SOURCE IS UPWIND OF RECEPTOR (KM)                   CZR0140
C          KST   STABILITY CLASS (THROUGH COMMON /METCON/)                     CZR0150
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C         THE OUTPUT VARIABLES ARE....                                          CZR0160
C         SZ    VERTICAL DISPERSION PARAMTER.                                   CZR0170
C         RCZ   RELATIVE CONCENTRATION HAS UNITS OF: PER METER.                 CZR0180
C      THE FOLLOWING EQUATION IS SOLVED --                                      CZR0190
C         RC = (1/2.5066 *SIGMA Z) * ((EXP(-.05*((Z-H)/SIGMA Z)**2)             CZR0200
C              + (EXP(-0.5*((Z+H)/SIGMA Z)**2))                                 CZR0210
C              PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (N=1,K) --         CZR0220
C                FOR NEUTRAL OR UNSTABLE CASES:                                 CZR0230
C                TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)                       CZR0240
C                TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)                       CZR0250
C                TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)                       CZR0260
C                TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)                       CZR0270
C         2.5066 IS THE SQUARE ROOT OF 2 * PI                                   CZR0280
C***NOTE THAT MIXING HEIGHT- THE TOP OF THE NEUTRAL OR UNSTABLE LAYER-          CZR0290
C***HAS A VALUE ONLY FOR STABILITIES 1-4, THAT IS, MIXING HEIGHT                CZR0300
C***DOES NOT EXIST FOR STABLE LAYERS AT THE GROUND SURFACE- STABILITY           CZR0310
C***5 OR 6.                                                                     CZR0320
C         STATEMENTS 190 TO 330 CALCULATE RC, THE RELATIVE CONCENTRATION,       CZR0330
C          USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE            CZR0340
C          VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.                  CZR0350
C          CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE                  CZR0360
C          EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN          CZR0370
C          -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS          CZR0380
C          PRINTED INFORMING OF THIS.                                           CZR0390
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.             CZR0400
C        IWRI IS CONTROL CODE FOR OUTPUT                                        CZR0410
      IWRI=6                                                                    CZR0420
C***IF STABLE, SKIP CONSIDERATION OF MIXING HEIGHT.                             CZR0430
      IF (KST.GE.5) GO TO 40                                                    CZR0440
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0., AND RETURN.               CZR0450
      IF (H-HL) 10,10,20                                                        CZR0460
10    IF (Z-HL) 40,40,180                                                       CZR0470
20    IF (Z-HL) 180,30,30                                                       CZR0480
30    WRITE (IWRI,430)                                                          CZR0490
      RETURN                                                                    CZR0500
C        IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS          CZR0510
C         PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                         CZR0520
40    IF (X-0.001) 180,50,50                                                    CZR0530
50    CALL PGSZ (X,KST,SZ)                                                      CZR0540
C         SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE          CZR0550
C         Z-DIRECTION (M)                                                       CZR0560
      IF (KST-4) 60,60,70                                                       CZR0570
60    IF (HL-5000.) 150,70,70                                                   CZR0580
C        IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT:                        CZR0590
70    C2=2.*SZ*SZ                                                               CZR0600
      IF (Z) 180,80,100                                                         CZR0610
C***FOR Z = ZERO:                                                               CZR0620
80    C3=H*H/C2                                                                 CZR0630
      IF (C3-50.) 90,180,180                                                    CZR0640
90    A2=2./EXP(C3)                                                             CZR0650
      RCZ=A2/(2.5066*SZ)                                                        CZR0660
      RETURN                                                                    CZR0670
C***FOR NON-ZERO Z:                                                             CZR0680
100   A2=0.                                                                     CZR0690
      A3=0.                                                                     CZR0700
      CA=Z-H                                                                    CZR0710
      CB=Z+H                                                                    CZR0720
      C3=CA*CA/C2                                                               CZR0730
      C4=CB*CB/C2                                                               CZR0740
      IF (C3-50.) 110,120,120                                                   CZR0750
110   A2=1./EXP(C3)                                                             CZR0760
120   IF (C4-50.) 130,140,140                                                   CZR0770
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  130   A3=1./EXP(C4)
  140   RCZ=(A2+A3)/(2.5066*SZ)                                          CZR0780
        RETURN                                                           CZR0790
C          IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,      CZR0800
C           THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH     CZR0810
C           HEIGHT REGARDLESS OF SOURCE HEIGHT.                         CZR0820
  150   IF (SZ/HL-1.6) 170,170,160                                       CZR0830
  160   RCZ=1./HL                                                        CZR0840
        RETURN                                                           CZR0850
C          INITIAL VALUE OF AN SET = 0.                                 CZR0860
C           AN   THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED    CZR0870
C            AND ADDED IN.                                              CZR0880
  170   AN=0.                                                            CZR0890
        IF (Z) 180,340,190                                               CZR0900
C***NOTE: AN ERRONEOUS NEGATIVE Z WILL RESULT IN ZERO CONCENTRATIONS.    CZR0910
  180   RCZ=0.                                                           CZR0920
        RETURN                                                           CZR0930
C***CALCULATE MULTIPLE EDDY REFLECTIONS FOR ELEVATED RECEPTOR HEIGHT.    CZR0940
  190   A1=1./(2.5066*SZ)                                                CZR0950
        C2=2.*SZ*SZ                                                      CZR0960
        A2=0.                                                            CZR0970
        A3=0.                                                            CZR0980
        CA=Z-H                                                           CZR0990
        CB=Z+H                                                           CZR1000
        C3=CA*CA/C2                                                      CZR1010
        C4=CB*CB/C2                                                      CZR1020
        IF (C3-50.) 200,210,210                                          CZR1030
  200   A2=1./EXP(C3)                                                    CZR1040
  210   IF (C4-50.) 220,230,230                                          CZR1050
  220   A3=1./EXP(C4)                                                    CZR1060
  230   SUM=0.                                                           CZR1070
        THL=2.*HL                                                        CZR1080
  240   AN=AN+1.                                                         CZR1090
        A4=0.                                                            CZR1100
        A5=0.                                                            CZR1110
        A6=0.                                                            CZR1120
        A7=0.                                                            CZR1130
        C5=AN*THL                                                        CZR1140
        CC=CA-C5                                                         CZR1150
        CD=CB-C5                                                         CZR1160
        CE=CA+C5                                                         CZR1170
        CF=CB+C5                                                         CZR1180
        C6=CC*CC/C2                                                      CZR1190
        C7=CD*CD/C2                                                      CZR1200
        C8=CE*CE/C2                                                      CZR1210
        C9=CF*CF/C2                                                      CZR1220
        IF (C6-50.) 250,260,260                                          CZR1230
  250   A4=1./EXP(C6)                                                    CZR1240
  260   IF (C7-50.) 270,280,280                                          CZR1250
  270   A5=1./EXP(C7)                                                    CZR1260
  280   IF (C8-50.) 290,300,300                                          CZR1270
  290   A6=1./EXP(C8)                                                    CZR1280
  300   IF (C9-50.) 310,320,320                                          CZR1290
  310   A7=1./EXP(C9)                                                    CZR1300
  320   T=A4+A5+A6+A7                                                    CZR1310
        SUM=SUM+T                                                        CZR1320
        IF (T-0.01) 330,240,240                                          CZR1330
  330   RCZ=A1*(A2+A3+SUM)                                               CZR1340
        RETURN                                                           CZR1350
C CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR HEIGHT   CZR1360
  340   A1=1./(2.5066*SZ)                                                CZR1370
        A2=0.                                                            CZR1380
                                                                         CZR1390
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      C2=2.*SZ*SZ
      C3=H*H/C2                                                          CZR1400
      IF (C3-50.) 350,360,360                                            CZR1410
350   A2=2./EXP(C3)                                                      CZR1420
360   SUM=0.                                                             CZR1430
      THL=2.*HL                                                          CZR1440
370   AN=AN+1.                                                           CZR1450
      A4=0.                                                              CZR1460
      A6=0.                                                              CZR1470
      C5=AN*THL                                                          CZR1480
      CC=H-C5                                                            CZR1490
      CE=H+C5                                                            CZR1500
      C6=CC*CC/C2                                                        CZR1510
      C8=CE*CE/C2                                                        CZR1520
      IF (C6-50.) 380,390,390                                            CZR1530
380   A4=2./EXP(C6)                                                      CZR1540
390   IF (C8-50.) 400,410,410                                            CZR1550
400   A6=2./EXP(C8)                                                      CZR1560
410   T=A4+A6                                                            CZR1570
      SUM=SUM+T                                                          CZR1580
      IF (T-0.01) 420,370,370                                            CZR1590
420   RCZ=A1*(A2+SUM)                                                    CZR1600
      RETURN                                                             CZR1610
C                                                                        CZR1620
430   FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABL CZR1630
     1E COMPUTATION CAN NOT BE MADE.')                                   CZR1640
C                                                                        CZR1650
      END                                                                CZR1660
                                                                         CZR1670
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      SUBROUTINE DBTRCR (U,Z,H,HL,X,Y,KST,SY,SZ,RC)
C      DETERMINE RELATIVE CONCENTRATION FROM POINT SOURCES.              RCR0010
C        SUBROUTINE DBTRCR CALCULATES CHI/Q CONCENTRATION VALUES; AND    RCR0020
C         CALLS UPON  PGSYSZ TO OBTAIN STANDARD DEVIATIONS.              RCR0030
C        THE INPUT VARIABLES ARE....                                     RCR0040
C          U     WIND SPEED (M/SEC)                                     RCR0050
C          Z     RECEPTOR HEIGHT (M)                                    RCR0060
C          H     EFFECTIVE STACK HEIGHT (M)                             RCR0070
C          HL    MIXING HEIGHT- TOP OF NEUTRAL OR UNSTABLE LAYER(M).    RCR0080
C          X     DISTANCE RECEPTOR IS DOWNWIND OF SOURCE (KM)           RCR0090
C          Y     DISTANCE RECEPTOR IS CROSSWIND FROM SOURCE (KM)        RCR0100
C          KST   STABILITY CLASS                                        RCR0110
C        THE OUTPUT VARIABLES ARE....                                    RCR0120
C          SY HORIZONTAL DISPERSION PARAMETER                            RCR0130
C          SZ VERTICAL DISPERSION PARAMETER                              RCR0140
C         RC   RELATIVE CONCENTRATION (SEC/M**3) ,CHI/Q                  RCR0150
C        IWRI IS CONTROL CODE FOR WARNING OUTPUT.                        RCR0160
      IWRI=6                                                             RCR0170
C        THE FOLLOWING EQUATION IS SOLVED --                             RCR0180
C          RC = (1/(2*PI*U*SIGMA Y*SIGMA Z))* (EXP(-0.5*(Y/SIGMA Y)**2)) RCR0190
C           (EXP(-0.5*((Z-H)/SIGMA Z)**2) + EXP(-0.5*((Z+H)/SIGMA Z)**2)) RCR0200
C             PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (K=1,K) --    RCR0210
C                  FOR NEUTRAL OR UNSTABLE CASES:                         RCR0220
C              TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)                   RCR0230
C              TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)                   RCR0240
C              TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)                   RCR0250
C              TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)                   RCR0260
C NOTE THAT MIXING HEIGHT- THE TOP OF THE NEUTRAL OR UNSTABLE LAYER-     RCR0270
C HAS A VALUE ONLY FOR STABILITIES 1-4, THAT IS, MIXING HEIGHT DOES      RCR0280
C NOT EXIST FOR STABLE LAYERS AT THE GROUND SURFACE- STABILITY 5 OR 6.    RCR0290
                                                                         RCR0300
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C         THE ABOVE EQUATION IS SIMILAR TO EQUATION (5.8) P 36 IN      RCR0310
C          WORKBOOK OF ATMOSPHERIC DISPERSION ESTIMATES WITH THE ADDITION RCR0320
C          OF THE EXPONENTIAL INVOLVING Y.                             RCR0330
C***IF STABLE, SKIP CONSIDERATION OF MIXING HEIGHT.                    RCR0340
      IF (KST.GE.5) GO TO 50                                           RCR0350
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0., AND RETURN.      RCR0360
      IF (H-HL) 10,10,20                                               RCR0370
10    IF (Z-HL) 50,50,40                                               RCR0380
20    IF (Z-HL) 40,30,30                                               RCR0390
30    WRITE (IWRI,460)                                                 RCR0400
40    RC=0.                                                            RCR0410
      RETURN                                                           RCR0420
C        IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS RCR0430
C         PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                 RCR0440
50    IF (X-0.001) 40,60,60                                            RCR0450
C        CALL PGSYSZ TO OBTAIN VALUES FOR SY AND SZ                    RCR0460
60    CALL PGSYSZ (X,KST,SY,SZ)                                        RCR0470
C         SY = SIGMA Y, THE STANDARD DEVIATION OF CONCENTRATION IN THE RCR0480
C         Y-DIRECTION (M)                                              RCR0490
C         SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE RCR0500
C         Z-DIRECTION (M)                                              RCR0510
      C1=1.                                                            RCR0520
      IF (Y) 70,90,70                                                  RCR0530
70    YD=1000.*Y                                                       RCR0540
C        YD IS CROSSWIND DISTANCE IN METERS.                           RCR0550
      DUM=YD/SY                                                        RCR0560
      TEMP=0.5*DUM*DUM                                                 RCR0570
      IF (TEMP-50.) 80,40,40                                           RCR0580
80    C1=EXP(TEMP)                                                     RCR0590
90    IF (KST-4) 100,100,110                                           RCR0600
100   IF (HL-5000.) 190,110,110                                        RCR0610
C        IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT,               RCR0620
C         USE EQUATION 3.2 IF Z = 0, OR EQ 3.1 FOR NON-ZERO Z.         RCR0630
C         (EQUATION NUMBERS REFER TO WORKBOOK OF ATMOSPHERIC DISPERSION RCR0640
C         ESTIMATES.)                                                  RCR0650
110   C2=2.*SZ*SZ                                                      RCR0660
      IF (Z) 40,120,140                                                RCR0670
C       NOTE: AN ERRONEOUS NEGATIVE Z WILL RESULT IN ZERO CONCENTRATIONS RCR0680
120   C3=H*H/C2                                                        RCR0690
      IF (C3-50.) 130,40,40                                            RCR0700
130   A2=1./EXP(C3)                                                    RCR0710
C        WADE EQUATION 3.2.                                            RCR0720
      RC=A2/(3.14159*U*SY*SZ*C1)                                       RCR0730
      RETURN                                                           RCR0740
140   A2=0.                                                            RCR0750
      A3=0.                                                            RCR0760
      CA=Z-H                                                           RCR0770
      CB=Z+H                                                           RCR0780
      C3=CA*CA/C2                                                      RCR0790
      C4=CB*CB/C2                                                      RCR0800
      IF (C3-50.) 150,160,160                                          RCR0810
150   A2=1./EXP(C3)                                                    RCR0820
160   IF (C4-50.) 170,180,180                                          RCR0830
170   A3=1./EXP(C4)                                                    RCR0840
C        WADE EQUATION 3.1.                                            RCR0850
180   RC=(A2+A3)/(6.28318*U*SY*SZ*C1)                                  RCR0860
      RETURN                                                           RCR0870
C        IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,       RCR0880
C         THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH     RCR0890
C         HEIGHT REGARDLESS OF SOURCE HEIGHT BECAUSE OF REPEATED EDDY  RCR0900
C         REFLECTIONS FROM THE GROUND AND THE MIXING HEIGHT.           RCR0910
190   IF (SZ/HL-1.6) 210,210,200                                       RCR0920
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C        WADE EQUATION 3.5.                                                    RCR0930
200   RC=1./(2.5066*U*SY*HL*C1)                                                RCR0940
      RETURN                                                                   RCR0950
C        INITIAL VALUE OF AN SET = 0.                                          RCR0960
C         AN - THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED             RCR0970
C              AND ADDED IN.                                                   RCR0980
210   AN=0.                                                                    RCR0990
      IF (Z) 40,370,220                                                        RCR1000
C       STATEMENTS 220-260 CALCULATE RC, THE RELATIVE CONCENTRATION,           RCR1010
C         USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE            RCR1020
C         VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.                  RCR1030
C         CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE                  RCR1040
C         EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN          RCR1050
C         -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS          RCR1060
C         PRINTED INFORMING OF THIS.                                           RCR1070
C       CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.             RCR1080
220   A1=1./(6.28318*U*SY*SZ*C1)                                               RCR1090
      C2=2.*SZ*SZ                                                              RCR1100
      A2=0.                                                                    RCR1110
      A3=0.                                                                    RCR1120
      CA=Z-H                                                                   RCR1130
      CB=Z+H                                                                   RCR1140
      C3=CA*CA/C2                                                              RCR1150
      C4=CB*CB/C2                                                              RCR1160
      IF (C3-50.) 230,240,240                                                  RCR1170
230   A2=1./EXP(C3)                                                            RCR1180
240   IF (C4-50.) 250,260,260                                                  RCR1190
250   A3=1./EXP(C4)                                                            RCR1200
260   SUM=0.                                                                   RCR1210
      THL=2.*HL                                                                RCR1220
270   AN=AN+1.                                                                 RCR1230
      A4=0.                                                                    RCR1240
      A5=0.                                                                    RCR1250
      A6=0.                                                                    RCR1260
      A7=0.                                                                    RCR1270
      C5=AN*THL                                                                RCR1280
      CC=CA-C5                                                                 RCR1290
      CD=CB-C5                                                                 RCR1300
      CE=CA+C5                                                                 RCR1310
      CF=CB+C5                                                                 RCR1320
      C6=CC*CC/C2                                                              RCR1330
      C7=CD*CD/C2                                                              RCR1340
      C8=CE*CE/C2                                                              RCR1350
      C9=CF*CF/C2                                                              RCR1360
      IF (C6-50.) 280,290,290                                                  RCR1370
280   A4=1./EXP(C6)                                                            RCR1380
290   IF (C7-50.) 300,310,310                                                  RCR1390
300   A5=1./EXP(C7)                                                            RCR1400
310   IF (C8-50.) 320,330,330                                                  RCR1410
320   A6=1./EXP(C8)                                                            RCR1420
330   IF (C9-50.) 340,350,350                                                  RCR1430
340   A7=1./EXP(C9)                                                            RCR1440
350   T=A4+A5+A6+A7                                                            RCR1450
      SUM=SUM+T                                                                RCR1460
      IF (T-0.01) 360,270,270                                                  RCR1470
360   RC=A1*(A2+A3+SUM)                                                        RCR1480
      RETURN                                                                   RCR1490
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR         RCR1500
C        HEIGHT.                                                               RCR1510
370   A1=1./(6.28318*U*SY*SZ*C1)                                               RCR1520
      A2=0.                                                                    RCR1530
      C2=2.*SZ*SZ                                                              RCR1540
```

```
      C3=U*H/C2                                                          RCR1550
      IF (C3-50.) 380,390,390                                            RCR1560
380   A2=2./EXP(C3)                                                      RCR1570
390   SUM=0.                                                             RCR1580
      THL=2.*HL                                                          RCR1590
400   AN=AN+1.                                                           RCR1600
      A4=0.                                                              RCR1610
      A6=0.                                                              RCR1620
      C5=AN*THL                                                          RCR1630
      CC=H-C5                                                            RCR1640
      CE=H+C5                                                            RCR1650
      C6=CC*CC/C2                                                        RCR1660
      C8=CE*CE/C2                                                        RCR1670
      IF (C6-50.) 410,420,420                                            RCR1680
410   A4=2./EXP(C6)                                                      RCR1690
420   IF (C8-50.) 430,440,440                                            RCR1700
430   A6=2./EXP(C8)                                                      RCR1710
440   T=A4+A6                                                            RCR1720
      SUM=SUM+T                                                          RCR1730
      IF (T-0.01) 450,400,400                                            RCR1740
450   RC=A1*(A2+SUM)                                                     RCR1750
      RETURN                                                             RCR1760
C                                                                        RCR1770
460   FORMAT (1H0,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABL RCR1780
     1E COMPUTATION CAN NOT BE MADE.')                                   RCR1790
C                                                                        RCR1800
      END                                                                RCR1810
```

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      SUBROUTINE PGSZ (X,IST,SZ)
C        D. B. TURNER, ENVIRONMENTAL APPLICATIONS BRANCH                 PGZ0010
C         METEOROLOGY LABORATORY, ENVIRONMENTAL PROTECTION AGENCY        PGZ0020
C          RESEARCH TRIANGLE PARK, N C 27711                             PGZ0030
C              (919) 549 - 8411, EXTENSION 4565                          PGZ0040
C        VERTICAL DISPERSION PARAMETER VALUE, SZ DETERMINED BY           PGZ0050
C         SZ = A * X ** B WHERE A AND B ARE FUNCTIONS OF BOTH STABILITY  PGZ0060
C         AND RANGE OF X.                                                PGZ0070
C        HORIZONTAL DISPERSION PARAMETER VALUE, SY DETERMINED BY         PGZ0080
C         LOGARITHMIC INTERPOLATION OF PLUME HALF-ANGLE ACCORDING TO     PGZ0090
C         DISTANCE AND CALCULATION OF 1/2.15 TIMES HALF-ARC LENGTH.      PGZ0100
      DIMENSION XA(7),XB(2),XD(5),XE(8),XF(9),AA(3),BA(8),AB(3),BB(3),   PGZ0110
     1 AD(6),BD(6),AE(9),BE(9),AF(10),BF(10)                             PGZ0120
      DATA XA/.5,.4,.3,.25,.2,.15,.1/                                    PGZ0130
      DATA XB/.4,.2/                                                     PGZ0140
      DATA XD /30.,10.,3.,1.,.3/                                         PGZ0150
      DATA XE /40.,20.,10.,4.,2.,1.,.3,.1/                               PGZ0160
      DATA XF /60.,30.,15.,7.,3.,2.,1.,.7,.2/                            PGZ0170
      DATA AA /453.85,346.75,258.89,217.41,179.52,170.22,158.08,122.8/   PGZ0180
      DATA BA /2.1166,1.7283,1.4094,1.2644,1.1262,1.0932,1.0542,.9447/   PGZ0190
      DATA AB /109.30,98.483,90.673/                                     PGZ0200
      DATA BB /1.0971,0.98332,0.93198/                                   PGZ0210
      DATA AD /44.053,36.650,33.504,32.093,32.093,34.459/                PGZ0220
      DATA BD /0.51179,0.56589,0.60486,0.64403,0.81066,0.86974/          PGZ0230
      DATA AE /47.618,35.420,26.970,24.703,22.534,21.628,21.628,23.331,  PGZ0240
     1 24.26/                                                            PGZ0250
      DATA BE /0.29592,0.37615,0.46713,0.50527,0.57154,0.63077,0.75660,  PGZ0260
     1 0.81956,0.8366/                                                   PGZ0270
      DATA AF /34.219,27.074,22.651,17.836,16.187,14.823,13.953,13.953,  PGZ0280
     1 14.457,15.209/                                                    PGZ0290
      DATA BF /0.21716,0.27436,0.32681,0.41507,0.46490,0.54503,0.63227,  PGZ0300
                                                                         PGZ0310
```

```
     1 0.68465,0.78407,0.81558/                                          PGZ0320
       GO TO (10,20,30,40,50,60),KST                                     PGZ0330
C         STABILITY A (10)                                              PGZ0340
 10    IF (X.GT.3.11) GO TO 69                                           PGZ0350
       DO 11 ID = 1,7                                                    PGZ0360
       IF(X.GE.XA(ID)) GO TO 12                                          PGZ0370
   11 CONTINUE                                                           PGZ0380
       ID = 8                                                            PGZ0390
   12 SZ = AA(ID) * X ** BA(ID)                                          PGZ0400
       GO TO 71                                                          PGZ0410
C         STABILITY B (20)                                              PGZ0420
 20    IF(X.GT.35.) GO TO 69                                             PGZ0430
       DO 21 ID = 1,2                                                    PGZ0440
       IF (X.GE.XB(ID)) GO TO 22                                         PGZ0450
   21 CONTINUE                                                           PGZ0460
       ID = 3                                                            PGZ0470
   22 SZ = AB(ID) * X ** BB(ID)                                          PGZ0480
       GO TO 70                                                          PGZ0490
C         STABILITY C (30)                                              PGZ0500
 30    SZ = 61.141 *X ** 0.91465                                         PGZ0510
       GO TO 70                                                          PGZ0520
C         STABILITY D (40)                                              PGZ0530
 40    DO 41 ID = 1,5                                                    PGZ0540
       IF (X.GE.XD(ID)) GO TO 42                                         PGZ0550
   41 CONTINUE                                                           PGZ0560
       ID = 6                                                            PGZ0570
   42 SZ = AD(ID) * X ** BD(ID)                                          PGZ0580
       GO TO 70                                                          PGZ0590
C         STABILITY E (50)                                              PGZ0600
 50    DO 51 ID = 1,8                                                    PGZ0610
       IF (X.GE.XE(ID)) GO TO 52                                         PGZ0620
   51 CONTINUE                                                           PGZ0630
       ID = 9                                                            PGZ0640
   52 SZ = AE(ID) * X ** BE(ID)                                          PGZ0650
       GO TO 70                                                          PGZ0660
C         STABILITY F (60)                                              PGZ0670
 60    DO 61 ID = 1,9                                                    PGZ0680
       IF (X.GE.XF(ID)) GO TO 62                                         PGZ0690
   61 CONTINUE                                                           PGZ0700
       ID = 10                                                           PGZ0710
   62 SZ = AF(ID) * X ** BF(ID)                                          PGZ0720
       GO TO 70                                                          PGZ0730
   69 SZ = 5000.                                                         PGZ0740
       GO TO 71                                                          PGZ0750
   70 IF (SZ.GT.5000.) SZ = 5000.                                        PGZ0760
 71    RETURN                                                            PGZ0770
       END                                                               PGZ0780
```

```
      SUBROUTINE PGSYSZ (X,KST,SY,SZ)                                    PGYZ010
C       D. B. TURNER, ENVIRONMENTAL APPLICATIONS BRANCH                  PGYZ020
C        METEOROLOGY LABORATORY, ENVIRONMENTAL PROTECTION AGENCY          PGYZ030
C          RESEARCH TRIANGLE PARK, N C 27711                              PGYZ040
C             (919) 549 - 8411, EXTENSION 4565                            PGYZ050
C       VERTICAL DISPERSION PARAMETER VALUE, SZ DETERMINED BY            PGYZ060
C        SZ = A * X ** B WHERE A AND B ARE FUNCTIONS OF BOTH STABILITY   PGYZ070
C        AND RANGE OF X.                                                 PGYZ080
C       HORIZONTAL DISPERSION PARAMETER VALUE, SY DETERMINED BY          PGYZ090
C        LOGARITHMIC INTERPOLATION OF PLUME HALF-ANGLE ACCORDING TO      PGYZ100
C        DISTANCE AND CALCULATION OF 1/2.15 TIMES HALF-ARC LENGTH.       PGYZ110
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      DIMENSION XA(7),XB(2),XD(5),XE(8),XF(9),AA(8),BA(8),AB(3),BB(3),
     1 AD(6),BD(6),AE(9),BE(9),AF(10),BF(10)
      DATA XA/.5,.4,.3,.25,.2,.15,.1/
      DATA XB/.4,.2/
      DATA XD /30.,10.,3.,1.,.3/
      DATA XE /40.,20.,10.,4.,2.,1.,.3,.1/
      DATA XF /60.,30.,15.,7.,3.,2.,1.,.7,.2/
      DATA AA /453.85,346.75,258.89,217.41,179.52,170.22,158.08,122.8/
      DATA BA /2.1166,1.7283,1.4094,1.2644,1.1262,1.0932,1.0542,.9447/
      DATA AB /109.30,98.483,90.673/
      DATA BB /1.0971,0.98332,0.93198/
      DATA AD /44.053,36.650,33.504,32.093,32.093,34.459/
      DATA BD /0.51179,0.56589,0.60486,0.64403,0.81066,0.86974/
      DATA AE /47.618,35.420,26.970,24.703,22.534,21.628,21.628,23.331,
     1 24.26/
      DATA BE /0.29592,0.37615,0.46713,0.50527,0.57154,0.63077,0.75660,
     1 0.81956,0.8366/
      DATA AF /34.219,27.074,22.651,17.836,16.187,14.823,13.953,13.953,
     1 14.457,15.209/
      DATA BF /0.21716,0.27436,0.32681,0.41507,0.46490,0.54503,0.63227,
     1 0.68465,0.78407,0.81558/
      XY=X
      GO TO (10,20,30,40,50,60),KST
C        STABILITY A (10)
   10 TH = (24.167 - 2.5334*ALOG(XY))/57.2958
      IF (X.GT.3.11) GO TO 69
      DO 11 ID = 1,7
      IF(X.GE.XA(ID)) GO TO 12
   11 CONTINUE
      ID = 8
   12 SZ = AA(ID) * X ** BA(ID)
      GO TO 71
C        STABILITY B (20)
   20 TH = (18.333 - 1.8096*ALOG(XY))/57.2958
      IF(X.GT.35.) GO TO 69
      DO 21 ID = 1,2
      IF (X.GE.XB(ID)) GO TO 22
   21 CONTINUE
      ID = 3
   22 SZ = AB(ID) * X ** BB(ID)
      GO TO 70
C        STABILITY C (30)
   30 TH = (12.5 - 1.0857*ALOG(XY))/57.2958
      SZ = 61.141 *X ** 0.91465
      GO TO 70
C        STABILITY D (40)
   40 TH = (8.3333-0.72382*ALOG(XY))/57.2958
      DO 41 ID = 1,5
      IF (X.GE.XD(ID)) GO TO 42
   41 CONTINUE
      ID = 6
   42 SZ = AD(ID) * X ** BD(ID)
      GO TO 70
C        STABILITY E (50)
   50 TH = (6.25 - 0.54287*ALOG(XY))/57.2958
      DO 51 ID = 1,8
      IF (X.GE.XE(ID)) GO TO 52
   51 CONTINUE
      ID = 9
   52 SZ = AE(ID) * X ** BE(ID)
      GO TO 70
C        STABILITY F (60)
```

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   60 TH = (4.1667 - 0.36191*ALOG(XY))/57.2958                          PGYZ740
      DO 61 ID = 1,9                                                    PGYZ750
      IF (X.GE.XF(ID)) GO TO 62                                         PGYZ760
   61 CONTINUE                                                          PGYZ770
      ID = 10                                                           PGYZ780
   62 SZ = AF(ID) * X ** BF(ID)                                         PGYZ790
      GO TO 70                                                          PGYZ800
   69 SZ = 5000.                                                        PGYZ810
      GO TO 71                                                          PGYZ820
   70 IF (SZ.GT.5000.) SZ = 5000.                                       PGYZ830
   71 SY = 465.116 * XY * SIN(TH) / COS(TH)                             PGYZ840
C        465.116 = 1000. (M/KM) / 2.15                                  PGYZ850
      RETURN                                                            PGYZ860
      END                                                               PGYZ870


      BLOCK DATA
C***COEFFICIENTS GENERATED WITH RURAL SIGMAS USING PGSYSZ & PGSZ         BLKR010
C***DISTANCE OF MAX. CONC. FROM PT SOURCE=PXCOF(KST,IH)*H**PXEXP(KST,IH) BLKR020
C***RELATIVE CONC. NORMALIZED FOR WIND SPEED FROM PT SOURCE, CHI*U/Q, =  BLKR030
C***     PXUCOF(KST,IH)*H**PXUEXP(KST,IH)                               BLKR040
C***DISTANCE OF MAX. CONC. FROM DOWNWIND EDGE OF AREA SOURCE =           BLKR050
C***     AXCOF(KST,IH)*H**AXEXP(KST,IH)                                 BLKR060
C***   IH=1 FOR H LESS THAN 20 METERS.                                   BLKR070
C***   IH=2 FOR H FROM 20 TO 30 METERS.                                  BLKR080
C***   IH=3 FOR H FROM 30 TO 50 METERS.                                  BLKR090
C***   IH=4 FOR H FROM 50 TO 70 METERS.                                  BLKR100
C***   IH=5 FOR H FROM 70 TO 100 METERS.                                 BLKR110
C***   IH=6 FOR H FROM 100 TO 200 METERS.                                BLKR120
C***   IH=7 FOR H FROM 200 TO 300 METERS.                                BLKR130
C***   IH=8 FOR H FROM 300 TO 500 METERS.                                BLKR140
C***   IH=9 FOR H GREATER THAN 500 METERS.                               BLKR150
     COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),     BLKR160
     *AXCOF(6,9),AXEXP(6,9),HC1(10)                                     BLKR170
      DATA   PXCOF/  .38964E-02,  .54607E-02,  .75278E-02,  .11563E-01, BLKR180
     *  .12743E-01,  .21051E-01,  .59088E-02,  .50774E-02,  .74442E-02, BLKR190
     *  .87095E-02,  .10152E-01,  .10867E-01,  .59366E-02,  .67049E-02, BLKR200
     *  .76095E-02,  .14437E-01,  .79376E-02,  .10552E-01,  .10739E-01, BLKR210
     *  .67199E-02,  .75237E-02,  .22618E-02,  .38170E-02,  .13053E-02, BLKR220
     *  .14425E-01,  .10509E-01,  .75283E-02,  .22489E-02,  .24006E-02, BLKR230
     *  .79956E-03,  .37139E-01,  .10418E-01,  .75363E-02,  .17287E-02, BLKR240
     *  .15400E-02,  .14422E-03,  .51107E-01,  .10468E-01,  .75324E-02, BLKR250
     *  .12670E-02,  .13842E-03,  .43952E-09,  .50921E-01,  .10472E-01, BLKR260
     *  .75225E-02,  .84890E-03,  .10930E-06,  .13979E-02,  .50996E-01, BLKR270
     *  .10401E-01,  .74961E-02,  .19441E-03,  .10659E-04,  .20000E+04/ BLKR280
      DATA   PXEXP/  .10995E+01,  .10757E+01,  .10965E+01,  .11383E+01, BLKR290
     *  .12469E+01,  .12577E+01,  .96054E+00,  .11000E+01,  .11002E+01, BLKR300
     *  .12329E+01,  .13228E+01,  .14784E+01,  .95916E+00,  .10182E+01, BLKR310
     *  .10937E+01,  .10843E+01,  .13951E+01,  .14870E+01,  .80763E+00, BLKR320
     *  .10176E+01,  .10966E+01,  .15582E+01,  .15023E+01,  .20212E+01, BLKR330
     *  .73818E+00,  .91238E+00,  .10965E+01,  .15595E+01,  .16914E+01, BLKR340
     *  .21366E+01,  .53282E+00,  .91427E+00,  .10963E+01,  .16166E+01, BLKR350
     *  .17878E+01,  .25085E+01,  .47257E+00,  .91337E+00,  .10964E+01, BLKR360
     *  .16753E+01,  .22426E+01,  .49057E+01,  .47321E+00,  .91331E+00, BLKR370
     *  .10966E+01,  .17455E+01,  .34951E+01,  .22807E+01,  .47297E+00, BLKR380
     *  .91440E+00,  .10971E+01,  .19827E+01,  .27551E+01,  .00000E+00/ BLKR390
      DATA  PXUCOF/  .10401E+00,  .12133E+00,  .14273E+00,  .15351E+00, BLKR400
     *  .13855E+00,  .13668E+00,  .77533E-01,  .11728E+00,  .14120E+00, BLKR410
     *  .18239E+00,  .20458E+00,  .34326E+00,  .67228E-01,  .10013E+00, BLKR420
     *  .13963E+00,  .19162E+00,  .38998E+00,  .76271E+00,  .40434E-01, BLKR430
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*   .75308E-01,   .13784E+00,   .54357E+00,   .72550E+00,   .22936E+01,   BLKR450
*   .28539E-01,   .66936E-01,   .13615E+00,   .52790E+00,   .12908E+01,   BLKR460
*   .56943E+01,   .14792E-01,   .65799E-01,   .13315E+00,   .74832E+00,   BLKR470
*   .23818E+01,   .40940E+03,   .12403E-01,   .64321E-01,   .12927E+00,   BLKR480
*   .10826E+01,   .77020E+02,   .23011E+05,   .12340E-01,   .62874E-01,   BLKR490
*   .12546E+00,   .15530E+01,   .68810E+03,   .46522E+06,   .12245E-01,   BLKR500
*   .60615E-01,   .11952E+00,   .22517E+01,   .42842E+03,   .00000E+00/   BLKR510
 DATA  PXUEXP/ -.19460E+01, -.19774E+01, -.20086E+01, -.20742E+01,         BLKR520
* -.21822E+01, -.22176E+01, -.18479E+01, -.19661E+01, -.20050E+01,         BLKR530
* -.21317E+01, -.22094E+01, -.24209E+01, -.18060E+01, -.19196E+01,         BLKR540
* -.20017E+01, -.21462E+01, -.23991E+01, -.26556E+01, -.16763E+01,         BLKR550
* -.18468E+01, -.19934E+01, -.24128E+01, -.25573E+01, -.29371E+01,         BLKR560
* -.15940E+01, -.18191E+01, -.19955E+01, -.24059E+01, -.26934E+01,         BLKR570
* -.31511E+01, -.14513E+01, -.18153E+01, -.19907E+01, -.24817E+01,         BLKR580
* -.28678E+01, -.40795E+01, -.14181E+01, -.18111E+01, -.19851E+01,         BLKR590
* -.25514E+01, -.34879E+01, -.48399E+01, -.14172E+01, -.18071E+01,         BLKR600
* -.19799E+01, -.26152E+01, -.38719E+01, -.53670E+01, -.14160E+01,         BLKR610
* -.18012E+01, -.19721E+01, -.26744E+01, -.37956E+01, -.17020E+02/         BLKR620
 DATA   AXCOF/  .68365E-02,   .79134E-02,   .11062E-01,   .14818E-01,     BLKR630
*   .17234E-01,   .19793E-01,   .92054E-02,   .94211E-02,   .11254E-01,   BLKR640
*   .13875E-01,   .91114E-02,   .65416E-02,   .12311E-01,   .11151E-01,   BLKR650
*   .11079E-01,   .53676E-02,   .48999E-02,   .17087E-02,   .19297E-01,   BLKR660
*   .13824E-01,   .11267E-01,   .42195E-02,   .17526E-02,   .13715E-03,   BLKR670
*   .32619E-01,   .13833E-01,   .11119E-01,   .30122E-02,   .11144E-02,   BLKR680
*   .73510E-06,   .53524E-01,   .13821E-01,   .11115E-01,   .22334E-02,   BLKR690
*   .20868E-04,   .23987E-05,   .55881E-01,   .13920E-01,   .11152E-01,   BLKR700
*   .11204E-02,   .21361E-05,   .20000E+04,   .55160E-01,   .13838E-01,   BLKR710
*   .11153E-01,   .61073E-03,   .10114E-03,   .20000E+04,   .55799E-01,   BLKR720
*   .13881E-01,   .11140E-01,   .61554E-03,   .20000E+04,   .20000E+04/   BLKR730
 DATA   AXEXP/  .10103E+01,   .10743E+01,   .10960E+01,   .12112E+01*      BLKR740
*   .13211E+01,   .14994E+01,   .91095E+00,   .10166E+01,   .10903E+01,   BLKR750
*   .12332E+01,   .15339E+01,   .18689E+01,   .82547E+00,   .96699E+00,   BLKR760
*   .10949E+01,   .15113E+01,   .17163E+01,   .22636E+01,   .71059E+00,   BLKR770
*   .91206E+00,   .10906E+01,   .15738E+01,   .19791E+01,   .29084E+01,   BLKR780
*   .58703E+00,   .91191E+00,   .10937E+01,   .16531E+01,   .20856E+01,   BLKR790
*   .41392E+01,   .47949E+00,   .91210E+00,   .10938E+01,   .17181E+01,   BLKR800
*   .29494E+01,   .38412E+01,   .47136E+00,   .91075E+00,   .10932E+01,   BLKR810
*   .18483E+01,   .33796E+01,   .00000E+00,   .47363E+00,   .91178E+00,   BLKR820
*   .10932E+01,   .19546E+01,   .27033E+01,   .00000E+00,   .47178E+00,   BLKR830
*   .91129E+00,   .10933E+01,   .19534E+01,   .00000E+00,   .00000E+00/   BLKR840
DATA HC1/10.,20.,30.,50.,70.,100.,200.,300.,500.,1000./                   BLKR850
END                                                                       BLKR860
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8. RAMFR PROGRAM LISTING

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C***   RURAL BATCH VERSION(78124) OF RAMFR                                    RFR0010
C***RAMFR IS THE RURAL VERSION OF RAM WHICH PRODUCES OUTPUT TO TAPE           RFR0020
C***OR DISK FOR PLOTTING CUMULATIVE FREQUENCY DISTRIBUTIONS FOR A YEAR.       RFR0030
C***RAM IS AN EFFICIENT GAUSSIAN-PLUME MULTIPLE-SOURCE                        RFR0040
C***AIR QUALITY ALGORITHM. RAM IS DESCRIBED IN: NOVAK,J.H., AND               RFR0050
C***TURNER,D.B., 1976: AIR POLLUTION CONTROL ASSOC. J., VOL. 26, NO. 6,       RFR0060
C***PAGES 570-575(JUNE 1976). RAM'S PRINCIPAL USE IS TO DETERMINE             RFR0070
C***SHORT TERM(ONE-HOUR TO ONE-DAY) CONCENTRATIONS FROM POINT AND             RFR0080
C***AREA SOURCES IN URBAN AREAS.                                              RFR0090
C***SEE RAM GLOSSARY FOR DEFINITIONS OF VARIABLES.                            RFR0100
C***                                                                          RFR0110
C***           POINT SOURCE INFORMATION                                       RFR0120
C***                                                                          RFR0130
C***SOURCE(9,#PT SOURCES)       1=EAST CO-ORD(USER UNITS)                     RFR0140
C***                            2=NORTH CO-ORD(USER UNITS)                    RFR0150
C***                            3=SO2 EMISSION RATE(G/SEC)                    RFR0160
C***                            4=PART EMISSION RATE(G/SEC)                   RFR0170
C***                            5=STACK HEIGHT(M)                             RFR0180
C***                            6=STACK TEMP(K)                               RFR0190
C***                            7=STACK DIAM(M)                               RFR0200
C***                            8=STACK VELOCITY(M/S)                         RFR0210
C***                            9=PARTIAL CALCULATION OF BUOYANCY             RFR0220
C***PNAME            12 CHARACTER PLANT IDENTIFICATION                        RFR0230
C***          AREA SOURCE INFORMATION                                         RFR0240
C***ASORC(6,#AREA SOURCES)  1=X CO-ORD(USER UNITS), SOUTHWEST CORNER           RFR0250
C***                        2=Y CO-ORD(USER UNITS), SOUTHWEST CORNER          RFR0260
C***                        3=SO2 EMISSION RATE(G/SEC)                        RFR0270
C***                        4=PART EMISSION RATE(G/SEC)                       RFR0280
C***                        5=SIDE LENGTH(USER UNITS)                         RFR0290
C***                        6=STACK HEIGHT(M)                                 RFR0300
      COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9),PXUCOF(6,9),PXUEXP(6,9),AXCO      RFR0310
     1F(6,9),AXEXP(6,9),HC1(10)                                               RFR0320
      COMMON /RELC/ CIN(3,200)                                                RFR0330
      COMMON /SORC/ IA(25,25),SOURCE(9,250),ASORC(6,100),UNITS,CONTWO,RR      RFR0340
     1EC(150),SREC(150),NPS(25),NAS(10),IOPT(13),IPOL,NRECEP,RMIN,RMAX,S      RFR0350
     2MIN,SMAX,IRSIZE,ISSIZE,NPT,NAS,NSIGP,NSIGA,PNAME(2,250),PSAV(250)       RFR0360
      COMMON /METCON/ ACHI(150),PCHI(150),ASIGS(150,11),PSIGS(150,26),IA      RFR0370
     1SIGS(100),IPSIGS(250),THETA,U,KST,HL,TEMP,SINT,COST,BPH(2),IUD,PAR      RFR0380
     2TC(250),AHCHI(150),PHCHI(150),ASIGS(150,11),PHSIGS(150,26),PL(6)        RFR0390
      COMMON /HEIGHT/ HINT(3),HARE(3),BPHH(2),FH                              RFR0400
      COMMON /METDAT/ QTHETA(24),QU(24),IKST(24),QHL(24),QTEMP(24),IDATE      RFR0410
     1(2)                                                                     RFR0420
      COMMON /RCGRID/ HRMIN,HRMAX,HSMIN,HSMAX                                 RFR0430
      COMMON /SUM/ ANNSUM(150), DMAX(2,5,150), HMAX(3,5,150)                  RFR0440
      COMMON ITYPE(150),ICODE(150),IN,IO,NIP,NID,NAVG                         RFR0450
      DIMENSION IFREQ(7), DEG(3), HSAV(250), RNAME(2,50), DUHR(24), HLH(      RFR0460
     12,24), LINE1(14), LINE2(14), LINE3(14), MODEL(2), DSAV(250), IMPS(      RFR0470
     225), IMAS(10), URREC(150), USREC(150), TITLE(2), GRANDS(150)            RFR0480
      DATA IFREQ /7*0/ ,DEG /90.,180.,270./ ,ICHAR /'I'/                      RFR0490
      DATA PL/0.07,0.07,0.10,0.15,0.35,0.55/                                  RFR0500
      DATA MODEL /'RURAL ','URBAN '/ ,TITLE /' SO2  ',' PART '/               RFR0510
      NRECEP=0                                                                RFR0520
      NPREC=0                                                                 RFR0530
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      NP=0                                                              RFR0540
      IN=5                                                              RFR0550
      IO=6                                                              RFR0560
C***NID-DISK OR TAPE INPUT OF PREPROCESSED EMISSION DATA. LIMITED TO:   RFR0570
C***150 RECEPTORS,250 POINT SOURCES AND 100 AREA SOURCES                RFR0580
C***NIT-DISK INPUT OF MET DATA                                          RFR0590
C***UNIT 12 TAPE/DISK OUTPUT OF HOURLY CONCENTRATIONS                   RFR0600
C***UNIT 13 TAPE/DISK OUTPUT OF DAILY CONCENTRATIONS                    RFR0610
C***UNIT 14 DISK OUTPUT OF SUMMARY DATA                                 RFR0620
C***UNIT 15 - TAPE/DISK INPUT OF HOURLY POINT SOURCE EMISSIONS          RFR0630
C***UNIT 16 - TAPE/DISK INPUT OF HOURLY AREA SOURCE EMISSIONS           RFR0640
      NID=9                                                             RFR0650
      NIT=11                                                            RFR0660
C***THREE SYSTEMS OF LENGTH AND COORDINATES ARE USED IN RAM:            RFR0670
C***  THE FIRST SYSTEM, USER UNITS, IS SELECTED BY THE USER AND         RFR0680
C***   NORMALLY USE THE COORDINATE SYSTEM OF THE EMISSION INVENTORY.    RFR0690
C***   ALL LOCATIONS INPUT BY THE USER(SUCH AS SOURCES AND RECEPTORS)   RFR0700
C***   ARE IN THIS SYSTEM. ALSO AS A CONVENIENCE TO THE USER ALL        RFR0710
C***  LOCATIONS ON OUTPUT ARE ALSO IN THIS SYSTEM.                      RFR0720
C***  THE SECOND SYSTEM, INTERNAL UNITS, IS USED INTERNALLY IN RAM      RFR0730
C***   FOR COORDINATE LOCATIONS AND DISTANCES. ONE INTERNAL UNIT IS THE RFR0740
C***   SIDE LENGTH OF THE SMALLEST AREA SOURCE SQUARE. THIS LENGTH MUST  RFR0750
C***   BE IDENTIFIED AND SPECIFIED BY THE USER. THE PURPOSE OF USING     RFR0760
C***   INTERNAL UNITS IS TO HAVE A CORRESPONDENCE BETWEEN LOCATION(GRID  RFR0770
C***   COORDINATES) AND PARTICULAR AREA SOURCE POSITIONS. THIS IS        RFR0780
C***   ACCOMPLISHED THROUGH THE USE OF THE AREA SOURCE MAP ARRAY(IA ARRAY RFR0790
C***   ). THIS ALLOWS DETERMINATION AS TO WITHIN WHICH AREA SOURCE ANY   RFR0800
C***   COORDINATE POINT RESIDES.                                         RFR0810
C***  THE THIRD SYSTEM,X,Y, IS AN UPWIND, CROSSWIND COORDINATE SYSTEM    RFR0820
C***   WITH REFERENCE TO EACH RECEPTOR. THE X-AXIS IS DIRECTED UPWIND    RFR0830
C***   (SAME AS WIND DIRECTION FOR THE PERIOD). IN ORDER TO DETERMINE    RFR0840
C***   DISPERSION PARAMETER VALUES AND EVALUATE EQUATIONS FOR            RFR0850
C***   CONCENTRATIONS, DISTANCES IN THIS SYSTEM MUST BE IN KILOMETERS.   RFR0860
C***                                                                     RFR0870
C***READ CARDS 1-3, IDENTIFICATION FOR TITLES.                          RFR0880
      READ (IN,940) LINE1,LINE2,LINE3                                   RFR0890
      WRITE (IO,950) LINE1,LINE2,LINE3                                  RFR0900
C***MODL IS INDICATOR FOR RURAL VERSION                                 RFR0910
      MODL=1                                                            RFR0920
      WRITE (IO,960)                                                    RFR0930
C***READ RAMQ OUTPUT FROM DISK OR TAPE; DATA IN INTERNAL UNITS.         RFR0940
      READ (NID) UNITS,CONTWO,CONONE,IPOL,NPT,IMPS,PNAME,IMOD           RFR0950
C***VERSION COMPATIBLE WITH RAMQ OUTPUT?                                RFR0960
      IF (IMOD.EQ.MODL) GO TO 10                                        RFR0970
      WRITE (IO,1000) MODEL(IMOD),MODEL(MODL)                           RFR0980
      CALL EXIT                                                         RFR0990
C***CONTINUE READING DATA TRANSFERRED FROM RAMQ.                        RFR1000
10    DO 20 I=1,9                                                       RFR1010
20    READ (NID) (SOURCE(I,J),J=1,NPT)                                  RFR1020
      READ (NID) NAS,IMAS,RMIN,RMAX,SMIN,SMAX,IRSIZE,ISSIZE             RFR1030
      DO 30 I=1,6                                                       RFR1040
30    READ (NID) (ASORC(I,J),J=1,NAS)                                   RFR1050
      DO 40 I=1,IRSIZE                                                  RFR1060
40    READ (NID) (IA(I,J),J=1,ISSIZE)                                   RFR1070
C***                                                                    RFR1080
C***READ CARD 4.                                                        RFR1090
C***OPTION LIST***(SEE RUN STREAM EXAMPLES OF RAM FOR DETAILED          RFR1100
C***DESCRIPTION OF INPUT VARIABLES).                                    RFR1110
C***NAVG IS INTERMEDIATE AVERAGING TIME IN HOURS                        RFR1120
C***HAFL IS POLLUTANT HALF-LIFE IN SECONDS                              RFR1130
      READ (IN,970) IOPT,NPER,NAVG,Z,HAFL,NSIGP,NSIGA,IDATE,IHSTRT     RFR1140
      WRITE (IO,1030) (I,IOPT(I),I=1,13)                                RFR1150
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      NDAYS=NAVG*NPER/24                                                RFR1160
      TLOS=693./HAFL                                                    RFR1170
C***693. = 0.693*1000 METERS/KM, TLOS IN METERS/KM-SEC.                 RFR1180
      IF (NAVG.EQ.0) CALL EXIT                                          RFR1190
C***READ SFC MET. STATION ID AND 2-DIGIT YEAR,                          RFR1200
C***MIXING HEIGHT STATION AND 2-DIGIT YEAR                              RFR1210
C***ONLY IF MET DATA IS FROM RAMMET                                     RFR1220
      IF (IOPT(11).EQ.1) GO TO 60                                       RFR1230
C***READ CARD TYPE 5 UNLESS USING OPTION 11.                            RFR1240
      READ (IN,970) ISFCD,ISFCYR,IMXD,IMXYR                             RFR1250
C***THE ABOVE FORMAT IS UNIVACS FREE FIELD INPUT.                       RFR1260
C***VARIABLES MUST BE SEPARATED BY COMMAS.                              RFR1270
C***THIS IS SIMILAR TO IBM'S LIST DIRECTED IO.                          RFR1280
C***CHECK TO INSURE CORRECT SURFACE DATA, MIXING HT. DATA, AND          RFR1290
C***PREPROCESSOR ARE BEING USED.                                        RFR1300
C***READ IDENTIFICATION RECORD FROM PREPROCESSED MET DISK OR TAPE FILE  RFR1310
      READ (NIT) ID,IYEAR,IDM,IYM                                       RFR1320
      IF (ISFCD.EQ.ID.AND.ISFCYR.EQ.IYEAR) GO TO 50                     RFR1330
      WRITE (IO,980) ISFCD,ISFCYR,ID,IYEAR                              RFR1340
      CALL EXIT                                                         RFR1350
50    IF (IMXD.EQ.IDM.AND.IMXYR.EQ.IYM) GO TO 60                        RFR1360
      WRITE (IO,990) IMXD,IMXYR,IDM,IYM                                 RFR1370
      CALL EXIT                                                         RFR1380
60    IP=IPOL-2                                                         RFR1390
      WRITE (IO,780) UNITS,CONONE,CONTWO,TITLE(IP),IPOL                 RFR1400
C***ECHO INPUT PARAMETERS                                               RFR1410
      WRITE (IO,790) NPER,NAVG,IDATE(2),IDATE(1),IHSTRT,Z,HAFL          RFR1420
      IF (IOPT(11).EQ.0) WRITE (IO,800) ISFCD,ISFCYR,IMXD,IMXYR         RFR1430
      WRITE (IO,810)                                                    RFR1440
C***IOPT(1) CONTROL OPTION, POINT SOURCE INPUT? 0=NO, 1=YES.            RFR1450
C***IF NO POINT SOURCES, SKIP DOWN TO AREA SOURCE CODE.                 RFR1460
      IF (IOPT(1).EQ.0) GO TO 150                                       RFR1470
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCE NUMBERS   RFR1480
C***0=NO, 1=YES.                                                        RFR1490
      IF (IOPT(12).EQ.0) GO TO 80                                       RFR1500
C***RLAD CARD TYPE 6 IF USING OPTIONS 1 AND 12.                         RFR1510
C***READ THE NUMBER OF SIGNIFICANT POINT SOURCES THAT USER WANTS TO     RFR1520
C***SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.               RFR1530
      READ (IN,870) INPT,(NPS(I),I=1,INPT)                              RFR1540
      IF (INPT.EQ.0) GO TO 80                                           RFR1550
      IF (NPS(INPT).EQ.0) WRITE (IO,880)                                RFR1560
      J=INPT+1                                                          RFR1570
      K=1                                                               RFR1580
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST     RFR1590
C***IF NSIGP GREATER THAN INPT.                                         RFR1600
      IF (J.GT.NSIGP) GO TO 100                                         RFR1610
      DO 70 I=J,NSIGP                                                   RFR1620
      NPS(I)=INPS(K)                                                    RFR1630
70    K=K+1                                                             RFR1640
      GO TO 100                                                         RFR1650
80    DO 90 I=1,NSIGP                                                   RFR1660
90    NPS(I)=INPS(I)                                                    RFR1670
100   WRITE (IO,950) LINE1,LINE2,LINE3                                  RFR1680
      WRITE (IO,820) NPT,NSIGP,(INPS(I),I=1,NSIGP)                      RFR1690
      WRITE (IO,1050)                                                   RFR1700
      IF (IOPT(13).EQ.0) GO TO 120                                      RFR1710
C***SAVE AVERAGE EMISSION RATE                                          RFR1720
      DO 110 I=1,NPT                                                    RFR1730
110   PSAV(I)=SOURCE(IPOL,I)                                            RFR1740
C***WRITE OUT POINT SOURCE LIST.                                        RFR1750
120   DO 130 I=1,NPT                                                    RFR1760
C***CONVERT TO USER UNITS FOR PRINT OUT.                                RFR1770
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      C1=SOURCE(1,I)*UNITS                                                  RFR1780
      C2=SOURCE(2,I)*UNITS                                                  RFR1790
      WRITE (IO,1060) I,(PNAME(L,I),L=1,2),C1,C2,(SOURCE(K,I),K=3,3)        RFR1800
      IPSIGS(I)=0                                                           RFR1810
130   CONTINUE                                                              RFR1820
C***FILL IN SIGNIFICANT POINT SOURCE ARRAY                                  RFR1830
      DO 140 I=1,NSIGP                                                      RFR1840
      J=NPS(I)                                                              RFR1850
140   IPSIGS(J)=I                                                           RFR1860
C***IOPT(2) CONTROL OPTION, AREA SOURCE INPUT? 0=NO, 1=YES.                 RFR1870
C***IF NO AREA SOURCES, SKIP DOWN TO INPUTTING RECEPTORS.                   RFR1880
150   IF (IOPT(2).EQ.0) GO TO 260                                           RFR1890
C***READ CARD TYPE 7 IF USING OPTION 2.                                     RFR1900
      READ (IN,970) FH,XLIM,NHTS,(HINT(I),I=1,NHTS)                         RFR1910
      NBP=NHTS-1                                                            RFR1920
      IF (NBP.LE.0) NBP=1                                                   RFR1930
C***READ CARD TYPE 8 IF USING OPTION 2.                                     RFR1940
      READ (IN,970) (BPH(I),I=1,NBP)                                        RFR1950
C***CONVERT TO USER UNITS FOR PRINT OUT. XLIM IS CONVERTED TO KM.           RFR1960
      C1=RMIN*UNITS                                                         RFR1970
      C2=RMAX*UNITS                                                         RFR1980
      C3=SMIN*UNITS                                                         RFR1990
      C4=SMAX*UNITS                                                         RFR2000
      C5=XLIM                                                               RFR2010
      WRITE (IO,950) LINE1,LINE2,LINE3                                      RFR2020
      XLIM=XLIM*CORONE                                                      RFR2030
      IF (XLIM.LT.116.) GO TO 160                                           RFR2040
      WRITE (IO,1040) XLIM                                                  RFR2050
      CALL EXIT                                                             RFR2060
C***IOPT(12) CONTROL OPTION, SPECIFY SIGNIFICANT POINT SOURCES? 0=NO,       RFR2070
C***  1=YES.                                                                RFR2080
160   IF (IOPT(12).EQ.0) GO TO 180                                          RFR2090
C***READ THE NUMBER OF SIGNIFICANT AREA SOURCES THAT USER                   RFR2100
C***WANTS TO SPECIFY AND THE NUMBER DESIGNATIONS OF THOSE SOURCES.          RFR2110
C***READ CARD TYPE 9 IF USING OPTIONS 2 AND 12.                             RFR2120
      READ (IN,870) INAS,(NAS(I),I=1,INAS)                                  RFR2130
      IF (INAS.EQ.0) GO TO 180                                              RFR2140
      IF (NAS(INAS).EQ.0) WRITE (IO,890)                                    RFR2150
      J=INAS+1                                                              RFR2160
      K=1                                                                   RFR2170
      IF (J.GT.NSIGA) GO TO 200                                             RFR2180
      DO 170 I=J,NSIGA                                                      RFR2190
      NAS(I)=INAS(K)                                                        RFR2200
170   K=K+1                                                                 RFR2210
      GO TO 200                                                             RFR2220
C***ADD SIGNIFICANT SOURCES DETERMINED FROM SIGNIFICANT SOURCE LIST         RFR2230
C***IF NSIGA GREATER THAN INAS.                                             RFR2240
180   DO 190 I=1,NSIGA                                                      RFR2250
190   NAS(I)=INAS(I)                                                        RFR2260
200   WRITE (IO,830) NAS,NSIGA,(INAS(I),I=1,NSIGA)                          RFR2270
      WRITE (IO,840) NHTS,(HINT(I),I=1,NHTS)                                RFR228
      WRITE (IO,850) (BPH(I),I=1,NBP)                                       RFR2290
      WRITE (IO,860) FH,C5,C1,C2,C3,C4,IRSIZE,ISSIZE                        RFR2300
C***IF IA ARRAY TOO LARGE TO BE PRINTED AS A MAP, PRINTING IS SKIPPED.      RFR2310
      IF (IRSIZE.GT.41) GO TO 220                                           RFR2320
C***PRINT OUT AREA SOURCE MAP ARRAY.                                        RFR2330
      WRITE (IO,1010)                                                       RFR2340
      JLIM=ISSIZE+1                                                         RFR2350
      DO 210 JDUM=1,ISSIZE                                                  RFR2360
      J=JLIM-JDUM                                                           RFR2370
210   WRITE (IO,1020) J,(IA(I,J),I=1,IRSIZE)                                RFR2380
      WRITE (IO,1190) (I,I=1,IRSIZE)                                        RFR2390
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      GO TO 230                                                          RFR2400
220   WRITE (IO,930)                                                     RFR2410
C***WRITE OUT THE AREA SOURCE LIST.                                      RFR2420
230   WRITE (IO,1070)                                                    RFR2430
      DO 240 I=1,NAS                                                     RFR2440
C***CONVERT TO USER UNITS FOR PRINT OUT                                  RFR2450
      C1=ASORC(1,I)*UNITS                                                RFR2460
      C2=ASORC(2,I)*UNITS                                                RFR2470
      C3=ASORC(5,I)*UNITS                                                RFR2480
      WRITE (IO,1080) I,C1,C2,(ASORC(K,I),K=3,4),C3,ASORC(6,I)           RFR2490
C***SIDE LENGTH IS MULTIPLIED BY .5 TO SAVE TIME IN LATER COMPUTATIONS   RFR2500
      ASORC(5,I)=ASORC(5,I)*0.5                                          RFR2510
      IASIGS(I)=0                                                        RFR2520
240   CONTINUE                                                           RFR2530
C***FILL IN SIGNIFICANT AREA SOURCE MARKER ARRAY                         RFR2540
      DO 250 I=1,NSIGA                                                   RFR2550
      J=MAS(I)                                                           RFR2560
250   IASIGS(J)=I                                                        RFR2570
C***INPUT PERMANENT RECEPTORS                                            RFR2580
C***IOPT(3) CONTROL OPTION, SPECIFIED RECEPTORS?  0 = NO, 1 = YES.       RFR2590
260   IF (IOPT(3).EQ.0) GO TO 300                                        RFR2600
270   NRECEP=NRECEP+1                                                    RFR2610
      IF (NRECEP.GT.150) GO TO 280                                       RFR2620
C***READ COORDINATES IN USER UNITS                                       RFR2630
C***ATTENTION USER: DON'T SPECIFY A RECEPTOR AT ORIGIN AS A BLANK CARD   RFR2640
C***IS USED TO INDICATE ALL RECEPTORS HAVE BEEN READ.                    RFR2650
C***READ CARD TYPE 10 IF USING OPTION 3.                                 RFR2660
      READ (IN,1090) (RNAME(J,NRECEP),J=1,2),URREC(NRECEP),USREC(NRECEP) RFR2670
C***BLANK CARD OR RECEPTOR AT ORIGIN SIGNALS ALL PERMANENT RECEPTORS      RFR2680
C***HAVE BEEN ENTERED.                                                   RFR2690
      IF (URREC(NRECEP)+USREC(NRECEP).LE.0.001) GO TO 280                RFR2700
      GO TO 270                                                          RFR2710
280   NRECEP=NRECEP-1                                                    RFR2720
C***SAVE NUMBER OF PERMANENT RECEPTORS                                   RFR2730
      NPREC=NRECEP                                                       RFR2740
C***PRINT OUT TABLE OF PERMANENT RECEPTORS***                            RFR2750
      WRITE (IO,950) LINE1,LINE2,LINE3                                   RFR2760
      WRITE (IO,1100)                                                    RFR2770
C***THE CHARACTER "I" INDICATES THAT THESE RECEPTORS WERE INPUT INTO      RFR2780
C***THE MODEL.                                                           RFR2790
      DO 290 K=1,NRECEP                                                  RFR2800
      ITYPE(K)=ICHAR                                                     RFR2810
      WRITE (IO,1110) K,ITYPE(K),(RNAME(J,K),J=1,2),URREC(K),USREC(K)    RFR2820
C***CONVERT TO INTERNAL UNITS                                            RFR2830
      RREC(K)=URREC(K)/UNITS                                             RFR2840
      SREC(K)=USREC(K)/UNITS                                             RFR2850
290   ICODE(K)=0                                                         RFR2860
C***IF NEITHER POINT OR AREA SOURCES WERE SPECIFIED,EXIT PROGRAM.        RFR2870
300   IF ((IOPT(1)+IOPT(2)).NE.0) GO TO 301                              RFR2880
      WRITE (IO,1120)                                                    RFR2890
      CALL EXIT                                                          RFR2900
C***READ IN THE NUMBER OF DAYS ALREADY PROCESSED AND LAST DAY TO BE      RFR2910
C***PROCESSED THIS RUN                                                   RFR2920
301   READ( IN,970) IDAY,LDRUN                                           RFR2930
      WRITE(IO,1200) IDAY,LDRUN                                          RFR2940
      IF(IDAY.LE.0) GO TO 310                                            RFR2950
C***POSITION OUTPUT FILES PAST LAST DAY PROCESSED                        RFR2960
      ISKIP=IDAY+2                                                       RFR2970
      DO 302 I=1,ISKIP                                                   RFR2980
302   READ(13)                                                           RFR2990
      ISKIP=IDAY*24+2                                                    RFR3000
      DO 303 I=1,ISKIP                                                   RFR3010
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303   READ(12)                                                          RFR3020
C***READ SUMMARY INFORMATION                                            RFR3030
      READ(14) IDAYS,ANNSUM,DMAX,HMAX                                   RFR3040
      REWIND 14                                                         RFR3050
      IF(IDAY.EQ.IDAYS) GO TO 304                                       RFR3060
      WRITE(1210) IDAY,IDAYS                                            RFR3070
      CALL EXIT                                                         RFR3080
304   IF(IOPT(13).EQ.0) GO TO 308                                       RFR3090
C***POSITION HOURLY EMISSION FILES                                      RFR3100
      ISKIP=ISKIP-2                                                     RFR3110
      IF(IOPT(1).EQ.0) GO TO 306                                        RFR3120
      DO 305 I=1,ISKIP                                                  RFR3130
305   READ(15)                                                          RFR3140
306   IF(IOPT(2).EQ.0) GO TO 308                                        RFR3150
      DO 307 I=1,ISKIP                                                  RFR3160
307   READ(16)                                                          RFR3170
C***IOPT(11) CONTROL OPTION, READ MET. DATA FROM CARDS? 0=NO, 1=YES.    RFR3180
308   IF(IOPT(11).EQ.1) GO TO 360                                       RFR3190
C***POSITION MET FILE TO CORRECT POSITION                               RFR3200
      DO 309 I=1,IDAY                                                   RFR3210
309   READ(NIT) JYR                                                     RFR3220
      GO TO 360                                                         RFR3230
C***INITIALIZATION                                                      RFR3240
C***WRITE INITIAL IDENTIFICATION RECORDS ON OUTPUT TAPE & DISK          RFR3250
310   WRITE (13) NDAYS,LINE1,LINE2,LINE3                                RFR3260
      WRITE (13) NRECEP,(URREC(I),I=1,NRECEP),(USREC(J),J=1,NRECEP)     RFR3270
      WRITE (12) NDAYS,LINE1,LINE2,LINE3                                RFR3280
      WRITE (12) NRECEP,(URREC(I),I=1,NRECEP),(USREC(J),J=1,NRECEP)     RFR3290
360   IDAY=IDAY+1                                                       RFR3300
      NHRS=0                                                            RFR3310
      IF (IOPT(11).EQ.1) GO TO 400                                      RFR3320
C***INPUT MET DATA FOR EACH DAY FROM DISK CREATED BY RAMMET,IOPT(11)=0  RFR3330
      READ (NIT) JYR,IMO,DAY1,IKST,QU,QTEMP,DUMR,QTHETA,HLH             RFR3340
      IF (JYR.NE.IDATE(1)) GO TO 370                                    RFR3350
      IDATE(2)=DAY1                                                     RFR3360
      IF (IDATE(2).EQ.IDAY) GO TO 380                                   RFR3370
C***DATE ON MET TAPE DOES NOT MATCH INTERNAL DATE                       RFR3380
370   WRITE (IO,740) JYR,IDATE(2),IDATE(1),IDAY                         RFR3390
      CALL EXIT                                                         RFR3400
C***MODIFY WIND VECTOR BY 180 DEGREES. SINCE FLOW VECTORS WERE OUTPUT   RFR3410
C***FROM RAMMET, THIS CONVERTS BACK TO WIND DIRECTIONS.                 RFR3420
380   DO 390 IQ=1,24                                                    RFR3430
      IF (IKST(IQ).EQ.7) IKST(IQ)=6                                     RFR3440
      QTHETA(IQ)=QTHETA(IQ)+180.                                        RFR3450
      IF (QTHETA(IQ).GT.360.) QTHETA(IQ)=QTHETA(IQ)-360.                RFR3460
C***RURAL MIXING HEIGHTS ARE USED FOR THIS APPLICATION                  RFR3470
390   QHL(IQ)=HLH(1,IQ)                                                 RFR3480
400   NB=IHSTRT                                                         RFR3490
      NE=NB+NAVG-1                                                      RFR3500
      IF (NB.GT.0) GO TO 410                                            RFR3510
      WRITE (IO,750) IHSTRT                                             RFR3520
      CALL EXIT                                                         RFR3530
410   WRITE (IO,950) LINE1,LINE2,LINE3                                  RFR3540
      U=0.0                                                             RFR3550
      TEMP=0.0                                                          RFR3560
      DELN=0.0                                                          RFR3570
      DELM=0.0                                                          RFR3580
      DO 420 I=1,7                                                      RFR3590
420   IFREQ(I)=0.0                                                      RFR3600
      DO 440 I=NB,NE                                                    RFR3610
      JHR=I                                                             RFR3620
      IF (IOPT(11).EQ.0) GO TO 430                                      RFR3630
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C***READ MET DATA FROM CARDS WITH FREE FORMAT                                   RFR3640
C***READ CARD TYPE 12 IF USING OPTION 11 ; JHR REDEFINED FROM METCARD.          RFR3650
      READ (IN,970) JYR,DAY1,JHR,IKST(JHR),QU(JHR),QTEMP(JHR),QTHETA(JHR RFR3660
     1),QHL(JHR)                                                               RFR3670
      IF (I.NE.NB) GO TO 430                                                   RFR3680
      IDATE(1)=JYR                                                             RFR3690
      IHSTRT=JHR                                                               RFR3700
      ISTDAY=DAY1                                                              RFR3710
      IDATE(2)=ISTDAY                                                          RFR3720
430   IF(I.EQ.NB) WRITE (IO,1130) IDATE                                        RFR3730
      TRAD=QTHETA(JHR)*0.01745329                                              RFR3740
      IF(IKST(JHR).EQ.7) IKST(JHR)=6                                           RFR3750
      WRITE (IO,1140) JHR,QTHETA(JHR),QU(JHR),QHL(JHR),QTEMP(JHR),IKST(J RFR3760
     1HR)                                                                      RFR3770
      SINT=SIN(TRAD)                                                           RFR3780
      COST=COS(TRAD)                                                           RFR3790
C***CALCULATE WIND COMPONENTS                                                  RFR3800
      URES=QU(JHR)                                                             RFR3810
      UR=URES*SINT                                                             RFR3820
      VR=URES*COST                                                             RFR3830
      DELM=DELM+UR                                                             RFR3840
      DELN=DELN+VR                                                             RFR3850
      TEMP=TEMP+QTEMP(JHR)                                                     RFR3860
      U=U+URES                                                                 RFR3870
      KST=IKST(JHR)                                                            RFR3880
440   IFREQ(KST)=IFREQ(KST)+1                                                  RFR3890
C***REDEFINE NB AND NE IN CASE NON-CONSECUTIVE DAYS ARE BEING RUN              RFR3900
      IF(IOPT(11).EQ.0) GO TO 441                                              RFR3910
      NB=IHSTRT                                                                RFR3920
      NE=IHSTRT+NAVG-1                                                         RFR3930
C***CALCULATE RESULTANT  WIND DIRECTION THETA                                  RFR3940
441   DELN=DELN/NAVG                                                           RFR3950
      DELM=DELM/NAVG                                                           RFR3960
      THETA=ANGARC(DELM,DELN)                                                  RFR3970
C***CALCULATE AVERAGE AND RESULTANT SPEED                                      RFR3980
      U=U/NAVG                                                                 RFR3990
      TEMP=TEMP/NAVG                                                           RFR4000
      URES=SQRT(DELN*DELN+DELM*DELM)                                           RFR4010
      PERSIS=URES/U                                                            RFR4020
C***DETERMINE MODAL AND AVERAGE STABILITY                                      RFR4030
      LSMAX=0                                                                  RFR4040
      DO 450 I=1,7                                                             RFR4050
      LST=IFREQ(I)                                                             RFR4060
      IF (LST.LE.LSMAX) GO TO 450                                              RFR4070
      LSMAX=LST                                                                RFR4080
      LSTAB=I                                                                  RFR4090
450   CONTINUE                                                                 RFR4100
      IP1=LSTAB+1                                                              RFR4110
      KST=LSTAB                                                                RFR4120
      DO 460 I=IP1,7                                                           RFR4130
      IF (LSMAX.EQ.IFREQ(I)) GO TO 470                                         RFR4140
460   CONTINUE                                                                 RFR4150
      GO TO 490                                                                RFR4160
C***IF TIE FOR MAX MODAL STABILITY CALCULATE AVERAGE STABILITY                 RFR4170
470   KSUM=0                                                                   RFR4180
      DO 480 J=1,7                                                             RFR4190
480   KSUM=KSUM+IFREQ(J)*J                                                     RFR4200
      KST=FLOAT(KSUM)/FLOAT(NAVG)+0.5                                          RFR4210
C***OUTPUT RESULTANT MET CONDITIONS***                                         RFR4220
490   WRITE (IO,1150)                                                          RFR4230
      WRITE (IO,1160) THETA,URES,U,TEMP,PERSIS,KST                             RFR4240
      TRAD=THETA*0.01745329                                                    RFR4250
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      SINT=SIN(TRAD)                                                    RFR4260
      COST=COS(TRAD)                                                    RFR4270
C***INITIALIZE CONCENTRATION SUMS                                       RFR4280
C***INITIALIZE FOR AVERAGING TIME                                       RFR4290
      DO 550 K=1,NRECEP                                                 RFR4300
      ACHI(K)=0.0                                                       RFR4310
      PCHI(K)=0.0                                                       RFR4320
      DO 530 I=1,11                                                     RFR4330
530   ASIGS(K,I)=0.0                                                    RFR4340
      DO 540 I=1,26                                                     RFR4350
540   PSIGS(K,I)=0.0                                                    RFR4360
550   CONTINUE                                                          RFR4370
C***                                                                    RFR4380
C***LOOP ON HOURS                                                       RFR4390
C***                                                                    RFR4400
570   DO 700 ILH=NB,NE                                                  RFR4410
      LH=ILH                                                            RFR4420
      IF (LH.LE.24) GO TO 580                                           RFR4430
      LH=MOD(ILH,24)                                                    RFR4440
      IF (LH.EQ.1) IDATE(2)=JAY1                                        RFR4450
C***INITIALIZE HOURLY ARRAYS                                            RFR4460
580   DO 610 K=1,NRECEP                                                 RFR4470
      AHCHI(K)=0.0                                                      RFR4480
      PHCHI(K)=0.0                                                      RFR4490
      DO 590 I=1,11                                                     RFR4500
590   AHSIGS(K,I)=0.0                                                   RFR4510
      DO 600 I=1,26                                                     RFR4520
600   PHSIGS(K,I)=0.0                                                   RFR4530
610   CONTINUE                                                          RFR4540
C***SET MET CONDITIONS FOR THIS HOUR***                                 RFR4550
      THETA=QTHETA(LH)                                                  RFR4560
      U=QU(LH)                                                          RFR4570
      HL=QHL(LH)                                                        RFR4580
      TEMP=QTEMP(LH)                                                    RFR4590
      KST=IKST(LH)                                                      RFR4600
C***DETERMINE WIND DIRECTION CONTROL, IWD, 90 DEG. QUADRANT OF WIND     RFR4610
C***                                                                    RFR4620
      DO 620 I=1,3                                                      RFR4630
      IF (THETA.LE.DEG(I)) GO TO 630                                    RFR4640
620   CONTINUE                                                          RFR4650
      I=4                                                               RFR4660
630   IWD=I                                                             RFR4670
      TRAD=THETA*0.01745329                                             RFR4680
      SINT=SIN(TRAD)                                                    RFR4690
      COST=COS(TRAD)                                                    RFR4700
C***CHECK FOR POINT SOURCES                                             RFR4710
      IF (IOPT(1).NE.1) GO TO 650                                       RFR4720
C***IOPT(13) CONTROL OPTION, HOURLY EMISSIONS INPUT? 0=NO, 1=YES        RFR4730
      IF (IOPT(13).EQ.0) GO TO 640                                      RFR4740
      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                              RFR4750
C***READ HOURLY POINT SOURCE RECORD                                     RFR4760
      READ (15) IDATP,(SOURCE(IPOL,I),I=1,NPT)                          RFR4770
C***CHECK DATE                                                          RFR4780
      IF (IDCK.EQ.IDATP) GO TO 640                                      RFR4790
      WRITE (IO,910) IDCK,IDATP                                         RFR4800
      CALL EXIT                                                         RFR4810
C***CALCULATE POINT SOURCE CONTRIBUTIONS                                RFR4820
640   CALL JMHPTR (HSAV,DSAV,Z,TLOS,LH)                                 RFR4830
C***CHECK FOR AREA SOURCES                                              RFR4840
650   IF (IOPT(2).NE.1) GO TO 680                                       RFR4850
C***IOPT(13) CONTROL OPTION, HOURLY EMISSION INPUT? 0=NO, 1=YES         RFR4860
      IF (IOPT(13).EQ.0) GO TO 675                                      RFR4870
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      IDCK=IDATE(1)*100000+IDATE(2)*100+LH                              RFR4880
C***READ HOURLY AREA SOURCE EMISSION RECORD                             RFR4890
      READ (16) IDATA,(ASORC(IPOL,I),I=1,NAS)                           RFR4900
C***CHECK DATE                                                          RFR4910
      IF (IDCK.EQ.IDATA) GO TO 660                                      RFR4920
      WRITE (IO,920) IDCK,IDATA                                         RFR4930
      CALL EXIT                                                         RFR4940
C***CONVERT HOURLY AREA EMISSIONS FROM G/SEC TO G/SQ. M/SEC             RFR4950
660   DO 670 I=1,NAS                                                    RFR4960
C***CONVERT SIDE LENGTH TO METERS.                                      RFR4970
C***NOTE: SIDE LENGTH HAD BEEN MULTIPLIED BY .5 ABOVE FOR TIME          RFR4980
C***CONSIDERATIONS                                                      RFR4990
      SF=ASORC(5,I)*2000*CONTWO                                         RFR5000
670   ASORC(IPOL,I)=ASORC(IPOL,I)/(SF*SF)                               RFR5010
C***SET UP INTEGRATION TABLES FOR AREA SOURCE CALCULATIONS***           RFR5020
675   CALL JHH54R (NHTS,Z,XLIM,TLOS)                                    RFR5030
C***CALCULATE AREA SOURCE CONTRIBUTIONS                                 RFR5040
      CALL JHHARE (NHTS,XLIM,LH)                                        RFR5050
C***WRITE HOURLY CONCENTRATIONS TO TAPE                                 RFR5060
680   DO 681 I=1,NRECEP                                                 RFR5070
681   GRANDS(I)=AHCHI(I)+PHCHI(I)                                       RFR5080
      WRITE(12) IDATE(2),LH,(GRANDS(I),I=1,NRECEP)                      RFR5090
C***SAVE HOURLY MAXIMUMS                                                RFR5100
      DO 690 K=1,NRECEP                                                 RFR5110
      IF(GRANDS(K).LE.HMAX(1,5,K)) GO TO 690                            RFR5120
C***CONCENTRATION IS ONE OF THE TOP 5                                   RFR5130
      DO 682 J=1,5                                                      RFR5140
      IF(GRANDS(K).GT.HMAX(1,J,K)) GO TO 683                            RFR5150
682   CONTINUE                                                          RFR5160
      WRITE(IO,1220)                                                    RFR5170
      GO TO 690                                                         RFR5180
C***INSERT IN PROPER POSITION                                           RFR5190
683   IF(J.EQ.5) GO TO 685                                              RFR5200
      DO 684 IJ=4,J,-1                                                  RFR5210
      IJP1=IJ+1                                                         RFR5220
      HMAX(1,IJP1,K)=HMAX(1,IJ,K)                                       RFR5230
      HMAX(2,IJP1,K)=HMAX(2,IJ,K)                                       RFR5240
684   HMAX(3,IJP1,K)=HMAX(3,IJ,K)                                       RFR5250
685   HMAX(1,J,K)=GRANDS(K)                                             RFR5260
      HMAX(2,J,K)=DAY1                                                  RFR5270
      HMAX(3,J,K)=LH                                                    RFR5280
690   CONTINUE                                                          RFR5290
700   CONTINUE                                                          RFR5300
      IF(NL.GT.24) IDATE(2)=ISTDAY                                      RFR5310
C***OUTPUT FINAL RESULTS                                                RFR5320
      CALL JHHFD (NB,LINE1,LINE2,LINE3)                                 RFR5330
      NP=NP+1                                                           RFR5340
      NHRS=NHRS+NAVG                                                    RFR5350
      IF(NP.GE.NPER) GO TO 720                                          RFR5360
      IF(NHRS.LT.24) GO TO 710                                          RFR5370
      IF(IDAY-LDRUN) 360,720,720                                        RFR5380
710   NB=NB+NAVG                                                        RFR5390
      NE=NE+NAVG                                                        RFR5400
      IF(NB.LE.24) GO TO 410                                            RFR5410
      NB=MOD(NB,24)                                                     RFR5420
      NE=NB+NAVG-1                                                      RFR5430
      GO TO 410                                                         RFR5440
720   END FILE 12                                                       RFR5450
      END FILE 12                                                       RFR5460
      END FILE 13                                                       RFR5470
      END FILE 13                                                       RFR5480
C***WRITE SUMMARY INFORMATION ON DISK                                   RFR5490
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      WRITE (14) IDAY,ANNSUM,DMAX,HMAX                                  RFR5500
      IF (LDRUN.NE.NDAYS) CALL EXIT                                     RFR5510
C***PRINT SUMMARY TABLES                                                RFR5520
      WRITE(IO,950) LINE1,LINE2,LINE3                                   RFR5530
      WRITE(IO,1230) (I,I=1,5)                                          RFR5540
      DO 725 K=1,NRECEP                                                 RFR5550
      ANMEAN=ANNSUM(K)/NDAYS                                            RFR5560
      WRITE(IO,1240) K,(DMAX(1,J,K),DMAX(2,J,K),J=1,5),ANMEAN           RFR5570
725   CONTINUE                                                          RFR5580
      WRITE(IO,950) LINE1,LINE2,LINE3                                   RFR5590
      WRITE(IO,1250) (I,I=1,5)                                          RFR5600
      DO 730 K=1,NRECEP                                                 RFR5610
      WRITE(IO,1260) K,(HMAX(1,J,K),HMAX(2,J,K),HMAX(3,J,K),J=1,5)      RFR5620
730   CONTINUE                                                          RFR5630
      CALL EXIT                                                         RFR5640
740   FORMAT (' DATE ON MET. TAPE, ',I2,I3,' ,DOES NOT MATCH INTERNAL DA RFR5650
     1TE, ',I2,I3)                                                      RFR5660
750   FORMAT (' HOUR ',I3,' IS NOT PERMITTED. HOURS MUST BE DEFINED BETW RFR5670
     1EEN 1 AND 24')                                                    RFR5680
780   FORMAT (1X,T21,'GENERAL INFORMATION FROM RAMQ'//2X,'UNITS - THERE  RFR5690
     1ARE',F14.7,' USER UNITS(INPUT UNITS) PER SMALLEST AREA SOURCE SQUA RFR5700
     2RE SIDE LENGTH (INTERNAL UNIT)'/2X,'CONONE - THERE ARE',F14.7,' KI RFR5710
     3LOMETERS PER USER UNIT'/2X,'CONTWO - IT IS CALCULATED THAT THERE A RFR5720
     4RE',F14.7,' KILOMETERS PER SMALLEST AREA SOURCE SQUARE SIDE LENGTH RFR5730
     5 (INTERNAL UNIT)'/2X,'THIS RUN IS FOR ',A6,'SINCE IPOL=',I2//1X)  RFR5740
790   FORMAT (1X,T21,'GENERAL INPUT DATA'//2X,'NUMBER OF PERIODS TO BE S RFR5750
     1IMULATED(NPER)= ',I3/2X,'AVERAGING TIME IN HOURS FOR EACH PERIOD(N RFR5760
     2AVG)= ',I5/2X,'STARTING DATE(IDATE(2),IDATE(1),INSTRT): JULIAN DAY RFR5770
     3 ',I4,', YEAR 19',I2,' HOUR= ',I2/2X,'RECEPTOR HEIGHT FOR ALL RECE RFR5780
     4PTORS(Z) ',F6.3,' METERS'/2X,'ASSUMED POLLUTANT HALF-LIFE(HAFL) ', RFR5790
     5F10.2,' SECONDS')                                                 RFR5800
800   FORMAT (2X,'SURFACE MET DATA FROM STATION(ISFCD) ',I6,', YEAR(ISFC RFR5810
     1YR) 19',I2/2X,'MIXING HEIGHT DATA FROM STATION(IMXD) ',I6,', YEAR( RFR5820
     2IMXYR) 19',I2)                                                    RFR5830
810   FORMAT (//1X)                                                     RFR5840
820   FORMAT ('0',T21,'POINT SOURCE INFORMATION'//2X,'EMISSION INFORMATI RFR5850
     1ON FOR ',I4,' (NPT) POINT SOURCES HAS BEEN DETERMINED BY RAMQ'/2X, RFR5860
     2I2,' SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN' RFR5870
     3/2X,'THE ORDER OF SIGNIFICANCE(IMPS) FOR 25 OR LESS POINT SOURCES RFR5880
     4DETERMINED BY RAMQ IS LISTED BY POINT SOURCE NUMBER:'/2X,25I5)    RFR5890
830   FORMAT (//1X,T21,'AREA SOURCE INFORMATION'//2X,'EMISSION INFORMATI RFR5900
     1ON FOR ',I4,' (NAS) AREA SOURCES HAS BEEN DETERMINED BY RAMQ'/2X,I RFR5910
     22,' SIGNIFICANT AREA SOURCES(NSIGA) ARE TO BE USED FOR THIS RUN'/2 RFR5920
     3X,' THE ORDER OF SIGNIFICANCE(IMAS) FOR 10 OR LESS  AREA SOURCES D RFR5930
     4ETERMINED BY RAMQ IS LISTED BY  AREA SOURCE NUMBER:'/2X,10I5)     RFR5940
840   FORMAT (2X,'NUMBER OF AREA HEIGHT CLASSES(NHTS)=',I2/2X,'REPRESENT RFR5950
     1ATIVE AREA SOURCE HEIGHTS FOR EACH HEIGHT CLASS(HINT) IN METERS=', RFR5960
     23F10.2)                                                           RFR5970
850   FORMAT (2X,'BREAK POINT HEIGHT BETWEEN THE AREA HEIGHT CLASSES(BPH RFR5980
     1) IN METERS=',2F10.2)                                             RFR5990
860   FORMAT (2X,'FRACTION OF AREA SOURCE HEIGHT WHICH IS PHYSICAL HEIGH RFR6000
     1T(FH)=',F10.3/2X,'LIMIT OF DISTANCE FOR AREA SOURCE INTEGRATION TA RFR6010
     2BLES(XLIM) IN USER UNITS =',F10.3/2X,'BOUNDARIES OF THE AREA SOURC RFR6020
     3E GRID IN USER UNITS:'/1X,T6,'RMIN=',F10.3,5X,'RMAX=',F10.3,5X,'SM RFR6030
     4IN=',F10.3,5X,'SMAX=',F10.3/2X,'SIZE(IRSIZE X ISSIZE) OF AREA SOUR RFR6040
     5CE MAP ARRAY(IA) IN INTERNAL UNITS =',I3,' EAST-WEST BY ',I3,' NOR RFR6050
     6TH-SOUTH'//1X)                                                    RFR6060
870   FORMAT (26I3)                                                     RFR6070
880   FORMAT (' ***ERROR IN SPECIFYING SIGNIF. POINT SOURCES***')       RFR6080
890   FORMAT (' ***ERROR IN SPECIFYING SIGNIF. AREA SOURCES***')        RFR6090
900   FORMAT (' ***PLEASE NOTE: THE RECEPTOR NUMBERS AND LOCATIONS GENER RFR6100
     1ATED FOR THIS AVERAGING TIME PERIOD ARE DIFFERENT FROM THOSE GENER RFR6110
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     2ATED FOR'/10X,' THE PRECEDING AVERAGING PERIOD.***')                    RFR6120
910   FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY POINT E      RFR6130
     1MISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')       RFR6140
920   FORMAT (' DATE BEING PROCESSED IS= ',I8/1X,'DATE OF HOURLY AREA EM      RFR6150
     1ISSION RECORD IS =',I8/1X,'***PLEASE CHECK EMISSION RECORDS***')        RFR6160
930   FORMAT (' AREA ARRAY IS TOO WIDE FOR PAGE SIZE, THEREFORE WILL NOT      RFR6170
     1 BE PRINTED.')                                                          RFR6180
940   FORMAT (13A6,A2/13A6,A2/13A6,A2)                                        RFR6190
950   FORMAT ('1',13A6,A2/1X,13A6,A2/1X,13A6,A2)                              RFR6200
960   FORMAT('0THIS IS THE NORMAL RURAL VERSION(78124) OF RAMFR FOR APPL      RFR6210
     1ICATION TO ONE OR SEVERAL DAYS DATA.'/1X)                               RFR6220
                                                                              RFR6230
970   FORMAT ()                                                               RFR6240
980   FORMAT (' SURFACE DATA IDENTIFERS READ INTO MODEL (STATION=',I5,         RFR6250
     1,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X,      RFR6260
     2' (STATION=',I5,' ,YEAR=',I2)                                           RFR6270
990   FORMAT (' MIXING HEIGHT IDENTIFERS READ INTO MODEL (STATION=',I5,'       RFR6280
     1 ,YEAR=',I2,') DO NOT AGREE WITH THE PREPROCESSOR OUTPUT FILE',/1X      RFR6290
     2,' (STATION=',I5,' ,YEAR=',I2)                                          RFR6300
1000  FORMAT (' *** THE ',A6,'VERSION OF THE PREPROCESSOR CAN NOT BE USE       RFR6310
     1D WITH THE ',A6,'VERSION OF THE MODEL***')                              RFR6320
1010  FORMAT ('0',13X,'AREA SOURCE MAP ARRAY(IA)'/1X)                         RFR6330
1020  FORMAT (1X,I3,2X,41I3/1X)                                               RFR6340
1030  FORMAT (1X,T3,'OPTION  ',T16,'OPTION LIST',T46,'OPTION SPECIFICATI      RFR6350
     1ON : 0= IGNORE OPTION'/1X,T68,' 1= USE OPTION'/1X,T7,I2,T16,'POINT      RFR6360
     2 SOURCE DATA',T51,I1/1X,T7,I2,T16,'AREA SOURCE DATA',T51,I1/1X,T7,      RFR6370
     3I2,T16,'PERMANENT RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT POIN      RFR6380
     4T RECEPTORS',T51,I1/1X,T7,I2,T16,'SIGNIFICANT AREA RECEPTORS',T51,      RFR6390
     5I1/1X,T7,I2,T16,'HONEYCOMB RECEPTORS',T51,I1/1X,T7,I2,T16,'HOURLY       RFR6400
     6OUTPUT',T51,I1/1X,T7,I2,T16,'PARTIAL CONC. WRITTEN TO DISK/TAPE',T      RFR6410
     751,I1/1X,T7,I2,T16,'PRINT ONLY SUMMARY HOURLY OUTPUT',,T51,I1/1X,T      RFR6420
     87,I2,T16,'PUNCH CARDS FOR CONTOURS',T51,I1/1X,T7,I2,T16,'READ MET       RFR6430
     9DATA FROM CARDS',T51,I1/1X,T7,I2,T16,'SPECIFY SIGNIFICANT SOURCE N      RFR6440
     AUMBERS',T51,I1/1X,T7,I2,T16,'READ HOURLY EMISSIONS',T51,I1/1X)          RFR6450
1040  FORMAT (' THE INPUT LIMIT OF MAX DISTANCE FOR AREA INTEGRATION ',','     RFR6460
     1 CONVERTS TO ',F10.3,' KM WHICH EXCEEDS STORAGE ','LIMITATIONS. UP      RFR6470
     2  TO 116 KM DISTANCES ARE ALLOWED.')                                    RFR6480
1050  FORMAT ('0',T50,'POINT SOURCE LISTING'//1X,T8,'SOURCE',T25,'EAST',      RFR6490
     1T33,'NORTH',T40,'SO2(G/SEC)  PART(G/SEC)  STACK  STACK   STACK        RFR6500
     2  STACK'/1X,T25,'COORD',T33,'COORD  EMISSIONS   EMISSIONS    HT(M)      RFR6510
     3  TEMP(K) ','DIAM(M) VEL(M/SEC)'/1X,T26,'(USER UNITS)'/1X)              RFR6520
1060  FORMAT (1X,T3,I3,1X,2A6,2X,2F9.2,F10.2,F11.2,2X,4F8.2)                  RFR6530
1070  FORMAT (/1X,T20,'AREA SOURCE LISTING'//1X,T2,'SOURCE',T10,'EAST',T      RFR6540
     118,'NORTH',T26,'SO2(G/SEC-M**2)',T44,'PART(G/SEC-M**2)  SIDE           RFR6550
     2EFFECTIVE'/1X,T10,'COORD   COORD',T29,'EMISSIONS',T46,'EMISSIONS',      RFR6560
     3T61,'LENGTH    HEIGHT'/1X,T11,'(USER UNITS)',T58,'(USER UNITS)',T7      RFR6570
     44,'(M)'/1X)                                                             RFR6580
1080  FORMAT (1X,T3,I3,2X,2F9.1,3X,1PE11.4,7X,1PE11.4,3X,0PF7.1,3X,F7.1)      RFR6590
1090  FORMAT (2A4,2F10.3)                                                     RFR6600
1100  FORMAT ('0',T9,'INPUT RECEPTORS'//1X,'RECEPTOR    IDENTIFICATION        RFR6610
     1EAST     NORTH    '/1X,T30,'COORD',T39,'COORD'/1X,T31,'(USER UNITS      RFR6620
     2)'/1X)                                                                  RFR6630
1110  FORMAT (1X,T4,I2,1X,A1,8X,2A4,7X,F6.2,3X,F7.2)                          RFR6640
1120  FORMAT (1X,'NO SOURCES SPECIFIED')                                      RFR6650
1130  FORMAT ('0INPUT MET DATA  ',I2,'/',I4/1X,T2,'HOUR   THETA    SPEED      RFR6660
     1   MIXING   TEMP     STABILITY '/1X,T9,'(DEG)    (M/S)  HEIGHT(M) (     RFR6670
     2DEG-K)  CLASS'/1X)                                                      RFR6680
1140  FORMAT (1X,T3,I2,4F9.2,6X,I1)                                           RFR6690
1150  FORMAT ('0','RESULTANT MET CONDITIONS'/1X)                              RFR6700
1160  FORMAT (2X,'WIND DIRECTION=',F7.2,T36,'RESULTANT WIND SPEED=',F7.2      RFR6710
     1/2X,'AVERAGE WIND SPEED=',F7.2,T36,'AVERAGE TEMP=',F7.2/2X,'WIND P      RFR6720
     2ERSISTENCE=',F6.3,T36,'MODAL STABILITY=',I2)                            RFR6730
1170  FORMAT ('0',T20,'GENERATED HONEYCOMB RECEPTORS'/1X,/1X,'THE AREA T      RFR6740
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     1O BE COVERED BY HONEYCOMB RECEPTORS IS BOUNDED BY:'/1X,' RMIN=',F1 RFR6740
     20.3,' RMAX=',F10.3,' SMIN=',F10.3,' SMAX=',F10.3//1X,'DISTANCE BET RFR6750
     3WEEN HONEYCOMB RECEPTORS(GRIDSP) IN USER UNITS=',F7.3//1X,'RECEPTO RFR6760
     4R     EAST      NORTH')                                            RFR6770
1180  FORMAT (1X,'NO RECEPTORS HAVE BEEN CHOSEN')                        RFR6780
1190  FORMAT (/6X,41I3/1X)                                               RFR6790
1200  FORMAT (//1X,' THE NUMBER OF PERIODS PREVIOUSLY COMPLETED EQUAL ', RFR6800
     1I3,' AND THE LAST PERIOD TO BE COMPLETED IN THIS RUN IS ',I3)      RFR6810
1210  FORMAT (' NUMBER OF DAYS PREVEIOUSLY PROCESSED, ',I4,' DOES NOT AG RFR6820
     1REE WITH LAST DAY WRITTEN IN SUMMARY FILE, ',I4/1X,'NON-CONSECUTIV RFR6830
     2E DAYS CANNOT BE PROCESSED')                                      RFR6840
1220  FORMAT (' ERROR IN FINDING HMAX')                                  RFR6850
1230  FORMAT (/1X,T41,'FIVE HIGHEST 24-HOUR CONCENTRATIONS((JULIAN DAY M RFR6860
     1AX OCCURS)'/1X,T49,'(MICROGRAMS/M**3)'//2X,'RECEPTOR NO.',8X,4(I1, RFR6870
     216X),I1,11X,'MEAN CONCENTRATION'/1X)                              RFR6880
1240  FORMAT (1X,T5,I2,5X,5(4X,6PF7.2,'(',0PF4.0,')'),7X,6PF7.2)        RFR6890
1250  FORMAT (/1X,T41,'FIVE HIGHEST 1-HOUR CONCENTRATIONS(JULIAN DAY MAX RFR6900
     1 OCCURS, HOUR)'/1X,T49,'(MICROGRAMS/M**3)'//2X,'RECEPTOR NO.',11X, RFR6910
     24(I1,20X),I1/1X)                                                  RFR6920
1260  FORMAT (1X,T5,I2,5X,5(4X,6PF7.2,'(',0PF4.0,',',F3.0,')'))         RFR6930
C                                                                        RFR6940
      END                                                                RFR6950
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9. CUMF - INPUT FORMATS AND EXAMPLE RUNSTEAMS

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CUMF
     CUMF PROCESSES 24-HOUR AVERAGE CONCENTRATION DATA(UNIT 8) CALCULATED BY
RAMF OR RAMFR TO PRODUCE CONCENTRATION FREQUENCY DISTRIBUTIONS
AT EACH RECEPTOR.  BOTH PRINTER AND PLOTTER OUTPUT ARE PROVIDED.
THE PLOTTER OUTPUT FILE, REFERRED TO IN THE EXAMPLE AS PLOT1,
MUST BE SYMMED TO A CALCOMP PLOT FILE ,  ACTUALLY CALLED PLOT AT NCC .


***** CARD INPUT TO CUMF *****

CARD 1 (13A6,A2)  TITLE   80 CHARACTER TITLE.
 EXAMPLE:
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.


CARD 2 (I3,3F5.0) NLOG,XDIM,YDIM,YBASE
C      NLOG      THE NUMBER OF LOG CYCLES ON THE CONCENTRATION SCALE.
C      XDIM      THE HORIZONTAL DIMENSION OF THE PLOT IN INCHES.
C      YDIM      THE VERTICAL DIMENSION OF THE PLOT IN INCHES.
C      YBASE     THE MINIMUM VALUE ON THE CONCENTRATION SCALE.
 EXAMPLE:
  4  10.    8.    1.


*****EXAMPLE ECL STREAM*****

@RUN,D/R JOBNAME,ACCNT-NO/USERID,PROJ-ID,1,100 . JOBNAME IS RESTRICTED TO 6 CHAR
@PASSWD PASSWORD
@ASG,A RAM24 .                              . DISK FILE OF DAILY CONCENTRATIONS
@USE 8,RAM24.
@PLOT PLOT1.
@USE 14,PLOT1.
@XQT A999*UNAMAP.CUMF
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.
  4  10.    8.    1.
@FREE PLOT1.
@SYM PLOT1,,PLOT                            . PLOT MUST BE SENT TO A CALCOMP PLOTTER
@SYM PRINT$,,PRINTER-ID                     . SEND PRINTOUT TO YOUR PRINTER


C
C*************************************************************************
C
C  THE PRECEEDING RUN STREAM HAD A RUN TIME OF 12.64 SECONDS
C  ON THE UNIVAC 1110 AND REQUIRED 30-K WORDS OF MEMORY
C  (APPROXIMATELY 8,487 WORDS FOR INSTRUCTIONS AND 20,076 WORDS FOR DATA)
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* EXAMPLE PRINTOUT FROM CUMF *
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RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION 1 AT 575.250, 4409.000 ANNUAL CONC. = 6.1 MICROGRAMS/CUBIC METER.

1	0.(50)	48	1.(256)	95	2.(320)	142	4.(55)	189	5.(29)	236	7.(280)	283	9.(110)	330	13.(169)
2	0.(338)	49	1.(224)	96	2.(34)	143	4.(42)	190	5.(215)	237	7.(337)	284	9.(125)	331	13.(299)
3	0.(339)	50	1.(38)	97	2.(87)	144	4.(132)	191	5.(194)	238	7.(54)	285	9.(229)	332	13.(297)
4	0.(340)	51	1.(32)	98	2.(105)	145	4.(200)	192	5.(101)	239	7.(209)	286	9.(97)	333	13.(252)
5	0.(134)	52	1.(148)	99	2.(266)	146	4.(286)	193	5.(165)	240	7.(174)	287	9.(359)	334	13.(65)
6	0.(248)	53	1.(80)	100	2.(317)	147	4.(214)	194	5.(59)	241	7.(328)	288	9.(109)	335	13.(315)
7	0.(361)	54	1.(144)	101	2.(53)	148	4.(37)	195	5.(56)	242	7.(199)	289	9.(6)	336	14.(276)
8	0.(51)	55	1.(324)	102	3.(341)	149	4.(176)	196	6.(222)	243	7.(123)	290	9.(31)	337	14.(198)
9	0.(13)	56	1.(112)	103	3.(342)	150	4.(104)	197	6.(30)	244	7.(21)	291	9.(246)	338	14.(264)
10	0.(255)	57	1.(302)	104	3.(149)	151	4.(117)	198	6.(273)	245	7.(160)	292	9.(79)	339	14.(48)
11	0.(33)	58	1.(69)	105	3.(192)	152	4.(20)	199	6.(84)	246	7.(146)	293	9.(7)	340	14.(140)
12	0.(190)	59	1.(100)	106	3.(113)	153	4.(178)	200	6.(238)	247	7.(136)	294	9.(240)	341	14.(314)
13	0.(94)	60	1.(107)	107	3.(296)	154	4.(358)	201	6.(212)	248	7.(219)	295	9.(126)	342	15.(159)
14	0.(220)	61	1.(90)	108	3.(364)	155	4.(169)	202	6.(45)	249	7.(158)	296	10.(357)	343	15.(265)
15	0.(309)	62	1.(57)	109	3.(166)	156	4.(332)	203	6.(239)	250	8.(237)	297	10.(46)	344	15.(300)
16	0.(98)	63	1.(277)	110	3.(133)	157	4.(3)	204	6.(275)	251	8.(96)	298	10.(350)	345	15.(288)
17	0.(52)	64	1.(354)	111	3.(303)	158	4.(231)	205	6.(2)	252	8.(318)	299	10.(78)	346	16.(36)
18	0.(71)	65	1.(81)	112	3.(221)	159	4.(142)	206	6.(153)	253	8.(61)	300	10.(180)	347	16.(327)
19	0.(322)	66	1.(119)	113	3.(291)	160	4.(66)	207	6.(329)	254	8.(143)	301	10.(218)	348	16.(163)
20	0.(254)	67	1.(76)	114	3.(193)	161	4.(151)	208	6.(92)	255	8.(59)	302	10.(157)	349	18.(182)
21	0.(230)	68	1.(99)	115	3.(128)	162	4.(10)	209	6.(121)	256	8.(173)	303	10.(197)	350	18.(43)
22	0.(185)	69	1.(210)	116	3.(64)	163	4.(40)	210	6.(258)	257	8.(152)	304	10.(179)	351	19.(23)
23	0.(243)	70	1.(235)	117	3.(93)	164	4.(35)	211	6.(259)	258	8.(281)	305	10.(261)	352	19.(22)
24	0.(312)	71	2.(1)	118	3.(122)	165	4.(150)	212	6.(242)	259	8.(167)	306	10.(82)	353	19.(306)
25	0.(28)	72	2.(26)	119	3.(155)	166	4.(70)	213	6.(352)	260	8.(11)	307	10.(353)	354	19.(269)
26	0.(147)	73	2.(41)	120	3.(294)	167	5.(204)	214	6.(287)	261	8.(301)	308	10.(15)	355	21.(228)
27	0.(333)	74	2.(207)	121	3.(114)	168	5.(236)	215	6.(345)	262	8.(171)	309	10.(363)	356	21.(205)
28	0.(283)	75	2.(27)	122	3.(60)	169	5.(145)	216	6.(183)	263	8.(62)	310	10.(18)	357	21.(213)
29	0.(334)	76	2.(9)	123	3.(226)	170	5.(232)	217	6.(131)	264	8.(75)	311	10.(299)	358	22.(284)
30	0.(175)	77	2.(321)	124	3.(216)	171	5.(154)	218	6.(127)	265	8.(201)	312	10.(346)	359	22.(311)
31	0.(88)	78	2.(351)	125	3.(195)	172	5.(16)	219	6.(323)	266	8.(343)	313	11.(250)	360	25.(308)
32	0.(85)	79	2.(348)	126	3.(257)	173	5.(164)	220	6.(316)	267	8.(227)	314	11.(208)	361	25.(177)
33	0.(282)	80	2.(108)	127	3.(270)	174	5.(365)	221	6.(83)	268	8.(285)	315	11.(356)	362	28.(206)
34	0.(89)	81	2.(225)	128	3.(331)	175	5.(14)	222	6.(187)	269	8.(234)	316	11.(188)	363	28.(253)
35	0.(68)	82	2.(279)	129	4.(102)	176	5.(326)	223	6.(12)	270	8.(355)	317	11.(263)	364	28.(307)
36	0.(278)	83	2.(130)	130	4.(290)	177	5.(217)	224	6.(162)	271	8.(245)	318	11.(262)	365	38.(260)
37	0.(139)	84	2.(289)	131	4.(44)	178	5.(77)	225	6.(138)	272	8.(241)	319	11.(67)		
38	0.(203)	85	2.(120)	132	4.(186)	179	5.(135)	226	6.(86)	273	9.(141)	320	11.(181)		
39	1.(129)	86	2.(244)	133	4.(202)	180	5.(116)	227	7.(233)	274	9.(118)	321	12.(336)		
40	1.(161)	87	2.(184)	134	4.(362)	181	5.(196)	228	7.(91)	275	9.(293)	322	12.(335)		
41	1.(292)	88	2.(169)	135	4.(251)	182	5.(349)	229	7.(274)	276	9.(17)	323	12.(319)		
42	1.(295)	89	2.(47)	136	4.(106)	183	5.(271)	230	7.(330)	277	9.(124)	324	12.(24)		
43	1.(74)	90	2.(325)	137	4.(63)	184	5.(170)	231	7.(249)	278	9.(19)	325	12.(313)		
44	1.(25)	91	2.(137)	138	4.(103)	185	5.(347)	232	7.(172)	279	9.(304)	326	12.(8)		
45	1.(39)	92	2.(4)	139	4.(310)	186	5.(73)	233	7.(95)	280	9.(49)	327	12.(268)		
46	1.(191)	93	2.(267)	140	4.(223)	187	5.(115)	234	7.(272)	281	9.(305)	328	13.(5)		
47	1.(360)	94	2.(156)	141	4.(211)	188	5.(247)	235	7.(111)	282	9.(72)	329	13.(344)		

GRAPH, NPLOT= 1
MAIN, KNTR = 50

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 76)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION 2 AT 576.000, 4404.000 ANNUAL CONC. = 10.1 MICROGRAMS/CUBIC METER.

1	0.(98)	48	4.(55)	95	5.(15)	142	7.(223)	189	8.(120)	236	11.(29)	283	14.(201)	330	19.(131)
2	0.(85)	49	4.(65)	96	5.(292)	143	7.(295)	190	8.(34)	237	11.(135)	284	14.(138)	331	20.(125)
3	1.(94)	50	4.(128)	97	5.(167)	144	7.(126)	191	8.(40)	238	11.(318)	285	14.(171)	332	20.(334)
4	1.(25)	51	4.(27)	98	5.(268)	145	7.(297)	192	9.(66)	239	11.(275)	286	14.(312)	333	20.(236)
5	1.(52)	52	4.(144)	99	6.(232)	146	7.(163)	193	9.(117)	240	11.(341)	287	14.(310)	334	20.(48)
6	1.(316)	53	4.(235)	100	6.(70)	147	7.(271)	194	9.(344)	241	11.(263)	288	15.(161)	335	20.(299)
7	1.(32)	54	4.(215)	101	6.(194)	148	7.(193)	195	9.(333)	242	11.(105)	289	15.(97)	336	20.(148)
8	2.(325)	55	4.(4)	102	6.(3)	149	7.(204)	196	9.(89)	243	11.(239)	290	15.(360)	337	20.(280)
9	2.(339)	56	4.(130)	103	6.(228)	150	7.(173)	197	9.(82)	244	11.(265)	291	15.(288)	338	21.(319)
10	2.(104)	57	4.(111)	104	6.(112)	151	7.(154)	198	9.(65)	245	11.(167)	292	15.(365)	339	21.(145)
11	2.(324)	58	4.(195)	105	6.(224)	152	7.(259)	199	9.(358)	246	11.(63)	293	15.(286)	340	21.(306)
12	2.(337)	59	4.(257)	106	6.(72)	153	7.(289)	200	9.(68)	247	11.(24)	294	15.(197)	341	21.(328)
13	2.(119)	60	4.(225)	107	6.(314)	154	7.(285)	201	9.(90)	248	11.(100)	295	15.(121)	342	22.(305)
14	2.(115)	61	4.(67)	108	6.(116)	155	7.(178)	202	9.(183)	249	11.(109)	296	15.(246)	343	22.(277)
15	2.(190)	62	4.(352)	109	6.(256)	156	8.(19)	203	9.(279)	250	11.(189)	297	15.(272)	344	22.(149)
16	2.(270)	63	4.(44)	110	6.(361)	157	8.(75)	204	9.(152)	251	12.(301)	298	16.(207)	345	23.(311)
17	2.(129)	64	4.(356)	111	6.(354)	158	8.(322)	205	9.(219)	252	12.(359)	299	16.(313)	346	23.(230)
18	2.(79)	65	4.(254)	112	6.(170)	159	8.(237)	206	9.(162)	253	12.(214)	300	16.(209)	347	24.(264)
19	2.(259)	66	4.(136)	113	6.(30)	160	8.(46)	207	9.(102)	254	12.(114)	301	16.(217)	348	24.(186)
20	2.(293)	67	4.(160)	114	6.(221)	161	8.(326)	208	9.(113)	255	12.(261)	302	16.(340)	349	25.(244)
21	2.(364)	68	4.(14)	115	6.(335)	162	8.(143)	209	9.(353)	256	12.(71)	303	16.(222)	350	25.(80)
22	3.(20)	69	4.(349)	116	6.(41)	163	8.(284)	210	9.(141)	257	12.(274)	304	17.(298)	351	26.(47)
23	3.(9)	70	4.(362)	117	6.(153)	164	8.(2)	211	9.(11)	258	[illegible].(181)	305	17.(28)	352	26.(176)
24	3.(255)	71	4.(106)	118	6.(320)	165	8.(21)	212	9.(157)	259	[illegible].(253)	306	17.(188)	353	27.(185)
25	3.(26)	72	4.(122)	119	6.(348)	166	8.(16)	213	9.(355)	260	12.(180)	307	17.(343)	354	27.(203)
26	3.(262)	73	4.(118)	120	6.(350)	167	8.(140)	214	9.(199)	261	12.(134)	308	17.(57)	355	27.(290)
27	3.(123)	74	4.(49)	121	6.(262)	168	8.(330)	215	10.(56)	262	12.(6)	309	17.(226)	356	28.(243)
28	3.(10)	75	4.(74)	122	6.(12)	169	8.(110)	216	10.(187)	263	12.(33)	310	17.(137)	357	29.(220)
29	3.(51)	76	5.(7)	123	6.(345)	170	8.(147)	217	10.(291)	264	12.(83)	311	17.(37)	358	31.(329)
30	3.(68)	77	5.(35)	124	6.(347)	171	8.(206)	218	10.(213)	265	12.(273)	312	18.(300)	359	31.(172)
31	3.(95)	78	5.(175)	125	6.(198)	172	8.(182)	219	10.(276)	266	12.(342)	313	18.(248)	360	31.(192)
32	3.(357)	79	5.(346)	126	7.(205)	173	8.(155)	220	10.(309)	267	12.(124)	314	18.(208)	361	32.(53)
33	3.(352)	80	5.(84)	127	7.(336)	174	8.(216)	221	10.(150)	268	13.(308)	315	18.(45)	362	32.(296)
34	3.(60)	81	5.(363)	128	7.(107)	175	8.(166)	222	10.(108)	269	13.(179)	316	18.(31)	363	38.(307)
35	3.(317)	82	5.(267)	129	7.(169)	176	8.(86)	223	10.(238)	270	13.(252)	317	18.(42)	364	39.(231)
36	3.(315)	83	5.(61)	130	7.(212)	177	8.(327)	224	10.(159)	271	13.(174)	318	18.(351)	365	40.(50)
37	3.(156)	84	5.(249)	131	7.(304)	178	8.(247)	225	10.(321)	272	13.(165)	319	18.(227)		
38	3.(99)	85	5.(266)	132	7.(234)	179	8.(1)	226	10.(91)	273	13.(77)	320	18.(62)		
39	3.(64)	86	5.(165)	133	7.(18)	180	8.(245)	227	10.(240)	274	13.(281)	321	18.(164)		
40	3.(139)	87	5.(156)	134	7.(87)	181	8.(54)	228	10.(58)	275	13.(251)	322	18.(323)		
41	3.(73)	88	5.(269)	135	7.(151)	182	8.(43)	229	10.(146)	276	13.(76)	323	18.(302)		
42	3.(196)	89	5.(241)	136	7.(59)	183	8.(142)	230	10.(13)	277	13.(81)	324	19.(202)		
43	3.(39)	90	5.(253)	137	7.(287)	184	8.(17)	231	10.(96)	278	14.(191)	325	19.(278)		
44	3.(38)	91	5.(229)	138	7.(23)	185	8.(210)	232	11.(36)	279	14.(260)	326	19.(339)		
45	3.(97)	92	5.(331)	139	7.(92)	186	8.(8)	233	11.(133)	280	14.(218)	327	19.(303)		
46	3.(242)	93	5.(103)	140	7.(211)	187	8.(200)	234	11.(283)	281	14.(164)	328	19.(7)		
47	4.(132)	94	5.(294)	141	7.(22)	188	8.(250)	235	11.(101)	282	14.(177)	329	19.(5)		

GRAPH, MPLOT= 2
MAIN, KNTR = 62

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION 3 AT 579.530, 4403.100 ANNUAL CONC. = 32.4 MICROGRAMS/CUBIC METER.

1	1.(12)	48	3.(106)	95	4.(318)	142	7.(352)	189	10.(55)	236	22.(286)	283	47.(307)	330	98.(342)
2	1.(94)	49	3.(127)	96	4.(109)	143	7.(56)	190	11.(198)	237	22.(118)	284	48.(273)	331	100.(71)
3	1.(116)	50	3.(121)	97	4.(364)	144	7.(213)	191	11.(112)	238	22.(194)	285	49.(6)	332	103.(322)
4	1.(102)	51	3.(8)	98	4.(314)	145	7.(275)	192	11.(135)	239	23.(270)	286	50.(351)	333	103.(211)
5	1.(19)	52	3.(26)	99	4.(39)	146	7.(262)	193	11.(16)	240	23.(358)	287	50.(287)	334	104.(206)
6	1.(117)	53	3.(356)	100	4.(348)	147	7.(196)	194	11.(138)	241	23.(317)	288	51.(100)	335	104.(334)
7	2.(95)	54	3.(78)	101	5.(131)	148	7.(316)	195	11.(183)	242	23.(192)	289	52.(244)	336	111.(200)
8	2.(115)	55	3.(195)	102	5.(40)	149	7.(237)	196	12.(299)	243	24.(7)	290	52.(152)	337	115.(217)
9	2.(2)	56	3.(22)	103	5.(51)	150	7.(208)	197	12.(311)	244	24.(91)	291	52.(278)	338	117.(202)
10	2.(9)	57	3.(123)	104	5.(163)	151	7.(130)	198	12.(274)	245	24.(354)	292	52.(34)	339	120.(203)
11	2.(67)	58	3.(305)	105	5.(29)	152	7.(75)	199	12.(265)	246	24.(156)	293	52.(221)	340	122.(28)
12	2.(24)	59	3.(233)	106	5.(129)	153	7.(242)	200	12.(214)	247	24.(30)	294	53.(66)	341	130.(193)
13	2.(98)	60	3.(234)	107	5.(327)	154	7.(300)	201	13.(45)	248	24.(139)	295	55.(184)	342	132.(207)
14	2.(357)	61	3.(84)	108	5.(48)	155	7.(132)	202	13.(89)	249	25.(260)	296	56.(69)	343	139.(290)
15	2.(212)	62	3.(281)	109	5.(4)	156	7.(172)	203	13.(119)	250	25.(189)	297	58.(147)	344	139.(77)
16	2.(63)	63	3.(240)	110	5.(38)	157	7.(164)	204	13.(259)	251	27.(205)	298	59.(310)	345	140.(178)
17	2.(363)	64	3.(146)	111	5.(174)	158	7.(177)	205	13.(218)	252	27.(258)	299	61.(333)	346	140.(81)
18	2.(350)	65	3.(269)	112	5.(44)	159	8.(298)	206	13.(199)	253	27.(245)	300	61.(231)	347	145.(248)
19	2.(150)	66	3.(15)	113	5.(20)	160	8.(288)	207	13.(136)	254	28.(76)	301	62.(13)	348	145.(149)
20	2.(92)	67	3.(125)	114	5.(14)	161	8.(153)	208	14.(253)	255	28.(277)	302	63.(289)	349	150.(283)
21	2.(336)	68	3.(65)	115	5.(111)	162	8.(224)	209	14.(279)	256	28.(227)	303	63.(256)	350	154.(50)
22	2.(65)	69	3.(86)	116	5.(284)	163	8.(292)	210	14.(41)	257	29.(93)	304	64.(216)	351	159.(137)
23	2.(122)	70	3.(250)	117	5.(88)	164	8.(313)	211	15.(260)	258	29.(249)	305	65.(238)	352	162.(302)
24	2.(101)	71	3.(353)	118	5.(328)	165	8.(247)	212	15.(155)	259	30.(35)	306	65.(133)	353	162.(312)
25	2.(169)	72	4.(126)	119	6.(180)	166	8.(222)	213	16.(99)	260	31.(303)	307	67.(167)	354	163.(220)
26	2.(79)	73	4.(319)	120	6.(347)	167	8.(17)	214	16.(80)	261	31.(229)	308	68.(323)	355	166.(201)
27	2.(271)	74	4.(18)	121	6.(83)	168	8.(197)	215	16.(266)	262	31.(57)	309	69.(226)	356	166.(338)
28	2.(72)	75	4.(5)	122	6.(341)	169	8.(175)	216	16.(140)	263	32.(108)	310	72.(68)	357	173.(296)
29	2.(331)	76	4.(239)	123	6.(107)	170	8.(154)	217	16.(188)	264	32.(215)	311	72.(360)	358	177.(42)
30	2.(82)	77	4.(114)	124	6.(332)	171	8.(97)	218	16.(308)	265	32.(110)	312	73.(330)	359	188.(295)
31	2.(162)	78	4.(103)	125	6.(326)	172	8.(335)	219	17.(70)	266	33.(329)	313	75.(1)	360	191.(254)
32	2.(160)	79	4.(181)	126	6.(60)	173	8.(62)	220	17.(173)	267	34.(151)	314	76.(47)	361	196.(243)
33	2.(113)	80	4.(96)	127	6.(223)	174	8.(306)	221	17.(236)	268	34.(228)	315	77.(149)	362	202.(190)
34	2.(61)	81	4.(264)	128	6.(246)	175	9.(158)	222	17.(297)	269	37.(105)	316	78.(337)	363	202.(134)
35	2.(73)	82	4.(263)	129	6.(261)	176	9.(182)	223	18.(235)	270	39.(255)	317	82.(191)	364	207.(185)
36	2.(46)	83	4.(187)	130	6.(219)	177	9.(165)	224	18.(209)	271	39.(31)	318	93.(37)	365	368.(339)
37	2.(362)	84	4.(124)	131	6.(52)	178	9.(32)	225	19.(340)	272	40.(251)	319	84.(176)		
38	2.(315)	85	4.(3)	132	6.(282)	179	9.(325)	226	20.(171)	273	40.(252)	320	85.(145)		
39	3.(128)	86	4.(43)	133	6.(10)	180	9.(142)	227	20.(74)	274	41.(272)	321	85.(210)		
40	3.(344)	87	4.(59)	134	6.(87)	181	9.(225)	228	20.(159)	275	43.(144)	322	88.(90)		
41	3.(274)	88	4.(54)	135	6.(359)	182	9.(320)	229	20.(257)	276	44.(186)	323	91.(361)		
42	3.(64)	89	4.(345)	136	6.(301)	183	10.(27)	230	21.(365)	277	44.(120)	324	91.(343)		
43	3.(168)	90	4.(143)	137	6.(294)	184	10.(293)	231	21.(59)	278	45.(161)	325	91.(33)		
44	3.(324)	91	4.(157)	138	6.(349)	185	10.(321)	232	21.(346)	279	45.(309)	326	92.(53)		
45	3.(11)	92	4.(304)	139	6.(170)	186	10.(104)	233	21.(141)	280	46.(241)	327	93.(49)		
46	3.(179)	93	4.(355)	140	7.(25)	187	10.(21)	234	21.(269)	281	47.(165)	328	94.(291)		
47	3.(23)	94	4.(232)	141	7.(267)	188	10.(285)	235	21.(36)	282	47.(204)	329	97.(230)		

GRAPH, NPLOT= 3
MAIN, KNTR = 65

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION 4 AT 576.790, 4400.560 ANNUAL CONC. = 39.8 MICROGRAMS/CUBIC METER.

1	1.(2)	48	3.(3)	95	5.(168)	142	7.(56)	189	12.(199)	236	23.(151)	283	53.(171)	330	132.(68)
2	1.(357)	49	3.(98)	96	5.(48)	143	7.(158)	190	12.(268)	237	23.(258)	284	54.(255)	331	133.(201)
3	1.(19)	50	3.(54)	97	5.(84)	144	7.(294)	191	12.(12)	238	24.(74)	285	56.(144)	332	134.(1)
4	2.(85)	51	3.(314)	98	5.(219)	145	7.(306)	192	12.(70)	239	24.(365)	286	58.(105)	333	138.(351)
5	2.(350)	52	3.(344)	99	5.(124)	146	7.(163)	193	12.(362)	240	24.(208)	287	60.(80)	334	141.(230)
6	2.(315)	53	3.(73)	100	5.(313)	147	7.(305)	194	12.(354)	241	24.(317)	288	60.(343)	335	144.(333)
7	2.(102)	54	3.(327)	101	5.(17)	148	7.(109)	195	12.(156)	242	25.(307)	289	61.(200)	336	145.(291)
8	2.(160)	55	3.(96)	102	5.(25)	149	7.(118)	196	12.(87)	243	25.(308)	290	62.(184)	337	147.(137)
9	2.(127)	56	3.(103)	103	5.(107)	150	7.(78)	197	12.(222)	244	25.(58)	291	64.(186)	338	152.(90)
10	2.(363)	57	3.(66)	104	5.(132)	151	7.(16)	198	13.(119)	245	25.(273)	292	64.(148)	339	155.(47)
11	2.(116)	58	3.(125)	105	5.(359)	152	8.(260)	199	13.(297)	246	26.(131)	293	65.(108)	340	157.(295)
12	2.(22)	59	3.(82)	106	5.(29)	153	8.(59)	200	13.(280)	247	26.(41)	294	65.(152)	341	157.(193)
13	2.(234)	60	3.(319)	107	5.(249)	154	8.(261)	201	13.(262)	248	26.(180)	295	66.(323)	342	158.(207)
14	2.(117)	61	3.(336)	108	5.(179)	155	8.(182)	202	13.(121)	249	27.(279)	296	66.(204)	343	164.(290)
15	2.(93)	62	3.(345)	109	5.(111)	156	8.(341)	203	13.(235)	250	27.(271)	297	70.(6)	344	169.(217)
16	2.(92)	63	4.(316)	110	5.(246)	157	8.(136)	204	14.(99)	251	27.(227)	298	70.(278)	345	173.(71)
17	2.(336)	64	4.(157)	111	5.(263)	158	8.(292)	205	14.(141)	252	28.(114)	299	70.(361)	346	185.(42)
18	2.(269)	65	4.(10)	112	5.(196)	159	8.(75)	206	14.(36)	253	29.(245)	300	72.(337)	347	186.(33)
19	2.(53)	66	4.(347)	113	5.(60)	160	8.(32)	207	14.(30)	254	29.(238)	301	73.(277)	348	188.(149)
20	2.(169)	67	4.(60)	114	6.(46)	161	8.(285)	208	15.(214)	255	29.(310)	302	77.(231)	349	189.(178)
21	2.(95)	68	4.(83)	115	6.(88)	162	8.(62)	209	15.(209)	256	29.(110)	303	78.(66)	350	190.(190)
22	2.(64)	69	4.(4)	116	6.(170)	163	8.(21)	210	15.(192)	257	30.(342)	304	80.(7)	351	194.(81)
23	2.(61)	70	4.(326)	117	6.(364)	164	8.(321)	211	16.(259)	258	31.(272)	305	81.(100)	352	202.(338)
24	2.(24)	71	4.(181)	118	6.(177)	165	8.(165)	212	16.(153)	259	32.(289)	306	83.(309)	353	207.(254)
25	2.(65)	72	4.(236)	119	6.(197)	166	8.(247)	213	16.(97)	260	32.(40)	307	84.(13)	354	226.(248)
26	2.(128)	73	4.(355)	120	6.(115)	167	8.(104)	214	16.(229)	261	33.(330)	308	87.(147)	355	228.(28)
27	2.(43)	74	4.(250)	121	6.(198)	168	8.(293)	215	16.(346)	262	34.(304)	309	87.(133)	356	234.(334)
28	2.(26)	75	4.(326)	122	6.(284)	169	8.(266)	216	16.(150)	263	34.(251)	310	87.(57)	357	245.(283)
29	2.(233)	76	4.(174)	123	6.(123)	170	9.(183)	217	16.(252)	264	34.(287)	311	87.(202)	358	253.(302)
30	2.(261)	77	4.(23)	124	6.(282)	171	9.(154)	218	16.(172)	265	34.(286)	312	88.(167)	359	257.(220)
31	2.(195)	78	4.(264)	125	6.(335)	172	9.(253)	219	17.(311)	266	35.(340)	313	89.(216)	360	269.(77)
32	3.(324)	79	4.(348)	126	6.(237)	173	9.(11)	220	17.(120)	267	36.(37)	314	91.(360)	361	313.(185)
33	3.(101)	80	4.(122)	127	6.(299)	174	9.(242)	221	18.(35)	268	36.(257)	315	94.(211)	362	325.(50)
34	3.(72)	81	4.(298)	128	6.(275)	175	9.(320)	222	18.(31)	269	36.(303)	316	97.(329)	363	343.(243)
35	3.(79)	82	4.(36)	129	6.(318)	176	9.(175)	223	18.(45)	270	37.(145)	317	98.(76)	364	355.(134)
36	3.(353)	83	4.(62)	130	6.(91)	177	9.(112)	224	18.(331)	271	39.(256)	318	100.(210)	365	415.(339)
37	3.(146)	84	4.(276)	131	6.(224)	178	9.(352)	225	18.(135)	272	40.(228)	319	101.(166)		
38	3.(8)	85	5.(39)	132	6.(274)	179	9.(265)	226	19.(288)	273	40.(188)	320	101.(226)		
39	3.(356)	86	5.(301)	133	6.(164)	180	10.(212)	227	20.(218)	274	40.(93)	321	103.(312)		
40	3.(44)	87	5.(232)	134	6.(213)	181	10.(27)	228	21.(215)	275	40.(194)	322	103.(191)		
41	3.(15)	88	5.(223)	135	6.(14)	182	10.(138)	229	21.(205)	276	42.(244)	323	106.(206)		
42	3.(18)	89	5.(325)	136	6.(142)	183	11.(55)	230	22.(113)	277	42.(139)	324	106.(49)		
43	3.(67)	90	5.(129)	137	6.(187)	184	11.(130)	231	22.(140)	278	42.(34)	325	106.(161)		
44	3.(126)	91	5.(300)	138	7.(225)	185	11.(155)	232	22.(173)	279	43.(221)	326	109.(296)		
45	3.(143)	92	5.(267)	139	7.(91)	186	11.(236)	233	23.(89)	280	45.(322)	327	110.(203)		
46	3.(240)	93	5.(349)	140	7.(52)	187	11.(159)	234	23.(241)	281	48.(358)	328	111.(69)		
47	3.(106)	94	5.(94)	141	7.(270)	188	11.(162)	235	23.(189)	282	52.(176)	329	121.(53)		

GRAPH, NPLOT= 4
MAIN, KNTR = 66

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION 5 AT 577.290, 4399.950 ANNUAL CONC. = 15.2 MICROGRAMS/CUBIC METER.

1	0.(19)	48	0.(160)	95	1.(174)	142	4.(266)	189	8.(26)	236	14.(139)	283	24.(279)	330	39.(200)
2	0.(22)	49	0.(126)	96	1.(103)	143	4.(73)	190	8.(93)	237	15.(194)	284	24.(57)	331	40.(58)
3	0.(117)	50	0.(183)	97	1.(98)	144	4.(94)	191	8.(235)	238	15.(238)	285	24.(256)	332	41.(77)
4	0.(328)	51	0.(313)	98	1.(163)	145	4.(164)	192	8.(182)	239	15.(341)	286	25.(175)	333	42.(255)
5	0.(336)	52	0.(125)	99	1.(324)	146	4.(165)	193	8.(359)	240	15.(241)	287	25.(35)	334	43.(286)
6	0.(353)	53	0.(281)	100	1.(142)	147	4.(20)	194	8.(362)	241	15.(227)	288	25.(310)	335	43.(186)
7	0.(344)	54	0.(213)	101	1.(139)	148	4.(293)	195	8.(237)	242	15.(311)	289	25.(33)	336	44.(252)
8	0.(72)	55	0.(301)	102	2.(181)	149	4.(162)	196	9.(119)	243	15.(307)	290	26.(28)	337	45.(340)
9	0.(169)	56	0.(159)	103	2.(30)	150	4.(10)	197	9.(97)	244	15.(321)	291	27.(34)	338	48.(190)
10	0.(269)	57	0.(21)	104	2.(83)	151	4.(115)	198	9.(68)	245	15.(87)	292	27.(13)	339	50.(226)
11	0.(350)	58	0.(79)	105	2.(168)	152	4.(88)	199	9.(222)	246	16.(90)	293	27.(45)	340	50.(309)
12	0.(43)	59	0.(298)	106	2.(16)	153	4.(52)	200	9.(288)	247	16.(228)	294	27.(211)	341	50.(217)
13	0.(8)	60	0.(305)	107	2.(14)	154	5.(55)	201	9.(214)	248	16.(251)	295	28.(224)	342	51.(50)
14	0.(363)	61	0.(9)	108	2.(297)	155	5.(180)	202	9.(330)	249	16.(270)	296	28.(210)	343	52.(230)
15	0.(264)	62	0.(85)	109	2.(64)	156	5.(299)	203	9.(292)	250	16.(136)	297	28.(202)	344	52.(236)
16	0.(5)	63	0.(54)	110	2.(129)	157	5.(110)	204	9.(99)	251	16.(75)	298	28.(112)	345	54.(277)
17	0.(239)	64	0.(157)	111	2.(347)	158	5.(59)	205	9.(352)	252	17.(333)	299	29.(147)	346	57.(337)
18	0.(127)	65	1.(284)	112	2.(4)	159	5.(25)	206	10.(27)	253	17.(247)	300	29.(221)	347	58.(148)
19	0.(61)	66	1.(265)	113	2.(104)	160	5.(154)	207	10.(70)	254	17.(254)	301	29.(302)	348	63.(244)
20	0.(65)	67	1.(124)	114	2.(107)	161	5.(118)	208	10.(131)	255	17.(1)	302	29.(259)	349	63.(185)
21	0.(357)	68	1.(158)	115	2.(187)	162	5.(155)	209	10.(108)	256	17.(193)	303	29.(207)	350	65.(137)
22	0.(102)	69	1.(318)	116	2.(11)	163	5.(132)	210	10.(166)	257	17.(153)	304	29.(361)	351	67.(172)
23	0.(2)	70	1.(223)	117	2.(349)	164	5.(156)	211	10.(51)	258	17.(49)	305	29.(201)	352	68.(278)
24	0.(319)	71	1.(326)	118	2.(260)	165	6.(331)	212	10.(120)	259	17.(66)	306	29.(289)	353	69.(149)
25	0.(315)	72	1.(96)	119	2.(232)	166	6.(258)	213	11.(304)	260	17.(135)	307	30.(275)	354	73.(243)
26	0.(234)	73	1.(246)	120	2.(274)	167	6.(4)	214	11.(346)	261	18.(184)	308	30.(47)	355	78.(145)
27	0.(116)	74	1.(109)	121	2.(267)	168	6.(113)	215	11.(189)	262	18.(89)	309	30.(287)	356	81.(231)
28	0.(177)	75	1.(67)	122	2.(12)	169	6.(229)	216	11.(178)	263	18.(245)	310	30.(273)	357	81.(191)
29	0.(263)	76	1.(335)	123	3.(364)	170	6.(253)	217	11.(188)	264	18.(283)	311	30.(206)	358	82.(248)
30	0.(48)	77	1.(300)	124	3.(276)	171	6.(205)	218	11.(74)	265	19.(317)	312	30.(294)	359	88.(290)
31	0.(18)	78	1.(142)	125	3.(197)	172	6.(69)	219	11.(262)	266	19.(40)	313	30.(134)	360	89.(220)
32	0.(24)	79	1.(111)	126	3.(316)	173	6.(3)	220	11.(199)	267	19.(42)	314	30.(334)	361	89.(296)
33	0.(355)	80	1.(345)	127	3.(123)	174	6.(78)	221	12.(39)	268	19.(105)	315	30.(216)	362	99.(192)
34	0.(101)	81	1.(325)	128	3.(36)	175	6.(63)	222	12.(114)	269	19.(204)	316	31.(329)	363	101.(312)
35	0.(92)	82	1.(196)	129	3.(38)	176	6.(17)	223	12.(76)	270	20.(365)	317	32.(360)	364	108.(203)
36	0.(82)	83	1.(23)	130	3.(219)	177	7.(32)	224	12.(225)	271	21.(161)	318	34.(280)	365	135.(176)
37	0.(240)	84	1.(233)	131	3.(332)	178	7.(173)	225	12.(167)	272	21.(295)	319	34.(62)		
38	0.(327)	85	1.(122)	132	3.(171)	179	7.(150)	226	12.(152)	273	21.(41)	320	34.(81)		
39	0.(195)	86	1.(179)	133	3.(141)	180	7.(208)	227	12.(7)	274	21.(320)	321	34.(53)		
40	0.(95)	87	1.(44)	134	3.(209)	181	7.(268)	228	13.(140)	275	21.(291)	322	35.(80)		
41	0.(356)	88	1.(56)	135	3.(29)	182	8.(358)	229	13.(249)	276	22.(130)	323	36.(257)		
42	0.(15)	89	1.(60)	136	3.(212)	183	8.(271)	230	13.(31)	277	22.(327)	324	36.(303)		
43	0.(128)	90	1.(346)	137	3.(285)	184	8.(151)	231	13.(100)	278	22.(272)	325	37.(71)		
44	0.(306)	91	1.(146)	138	4.(144)	185	8.(242)	232	14.(342)	279	23.(37)	326	38.(338)		
45	0.(314)	92	1.(170)	139	4.(121)	186	8.(218)	233	14.(354)	280	23.(215)	327	38.(339)		
46	0.(106)	93	1.(46)	140	4.(198)	187	8.(91)	234	14.(6)	281	24.(343)	328	39.(308)		
47	0.(250)	94	1.(86)	141	4.(261)	188	8.(282)	235	14.(133)	282	24.(351)	329	39.(322)		

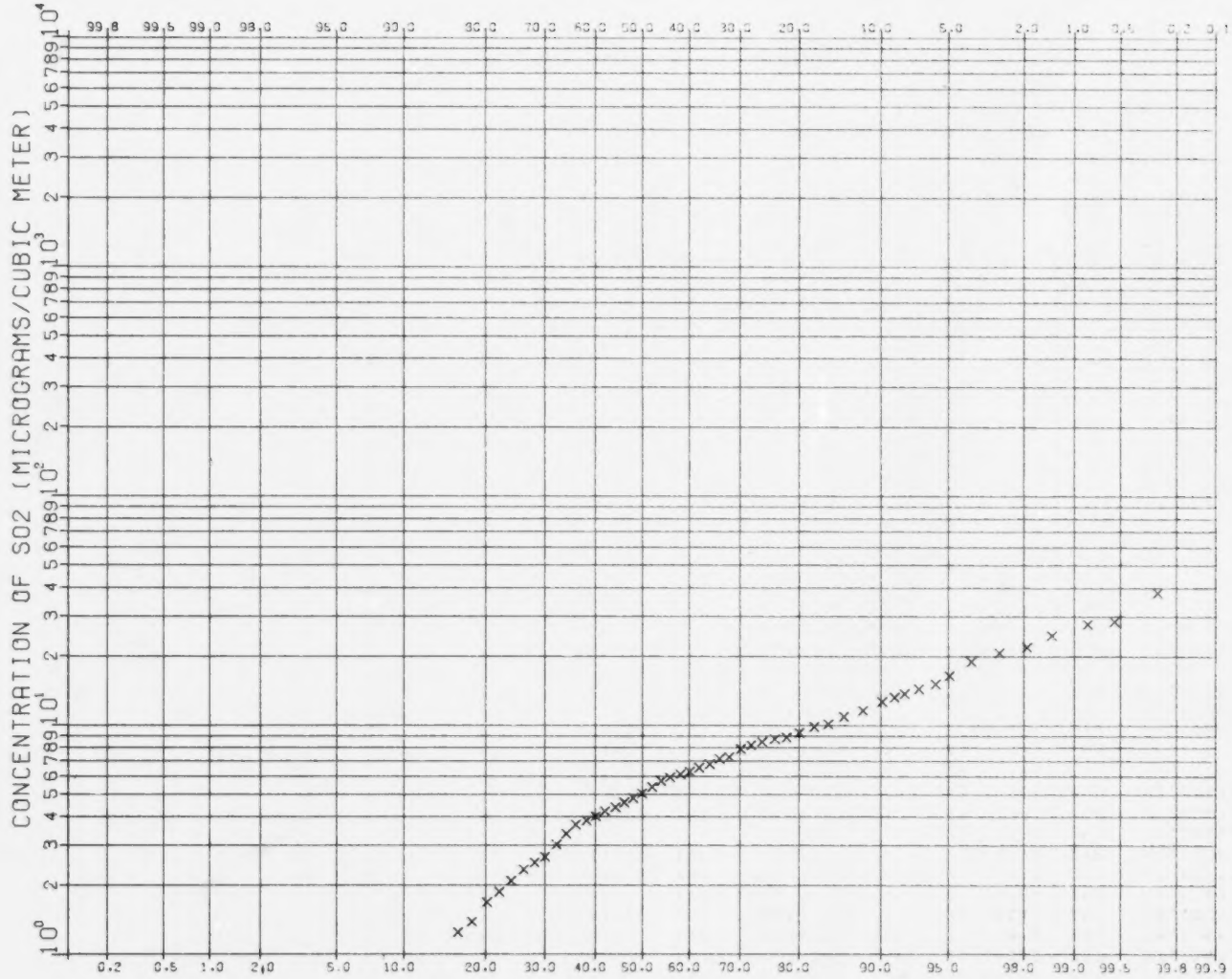
GRAPH, NPLOT= 5
MAIN, KNTR = 47

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)
EMISSIONS: TEST CITY, 1973
SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973

CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION 6 AT 579.530, 4403.160 ANNUAL CONC. = 40.0 MICROGRAMS/CUBIC METER.

1	1.(12)	48	3.(179)	95	4.(109)	142	7.(132)	189	11.(138)	236	20.(205)	283	51.(144)	330	132.(193)
2	1.(94)	49	3.(127)	96	4.(355)	143	7.(213)	190	11.(285)	237	20.(241)	284	55.(310)	331	137.(217)
3	1.(116)	50	3.(123)	97	4.(318)	144	7.(170)	191	11.(299)	238	21.(110)	285	55.(287)	332	141.(71)
4	1.(102)	51	3.(8)	98	4.(364)	145	7.(88)	192	11.(151)	239	21.(159)	286	56.(37)	333	142.(333)
5	1.(19)	52	3.(78)	99	4.(314)	146	7.(56)	193	11.(16)	240	21.(118)	287	57.(148)	334	143.(338)
6	1.(117)	53	3.(106)	100	5.(348)	147	7.(196)	194	11.(276)	241	21.(286)	288	58.(66)	335	144.(351)
7	2.(95)	54	3.(233)	101	5.(131)	148	7.(242)	195	12.(311)	242	22.(354)	289	59.(108)	336	145.(47)
8	2.(9)	55	3.(305)	102	5.(63)	149	7.(262)	196	12.(320)	243	22.(268)	290	61.(13)	337	145.(137)
9	2.(2)	56	3.(22)	103	5.(163)	150	7.(237)	197	12.(154)	244	23.(35)	291	62.(251)	338	146.(291)
10	2.(115)	57	3.(281)	104	5.(129)	151	7.(164)	198	12.(253)	245	23.(257)	292	66.(204)	339	149.(254)
11	2.(67)	58	3.(234)	105	5.(4)	152	7.(17)	199	12.(214)	246	23.(279)	293	71.(145)	340	158.(230)
12	2.(357)	59	3.(356)	106	5.(29)	153	7.(300)	200	12.(259)	247	23.(120)	294	72.(343)	341	160.(290)
13	2.(98)	60	3.(195)	107	5.(38)	154	7.(156)	201	12.(265)	248	23.(9)	295	72.(147)	342	162.(203)
14	2.(24)	61	3.(146)	108	5.(294)	155	7.(153)	202	13.(183)	249	24.(99)	296	74.(176)	343	165.(295)
15	2.(212)	62	3.(240)	109	5.(327)	156	8.(298)	203	13.(119)	250	24.(317)	297	74.(49)	344	171.(33)
16	2.(363)	63	3.(40)	110	5.(44)	157	8.(288)	204	13.(199)	251	25.(97)	298	76.(184)	345	177.(190)
17	2.(350)	64	3.(84)	111	5.(48)	158	8.(62)	205	13.(172)	252	25.(221)	299	77.(105)	346	179.(53)
18	2.(162)	65	3.(269)	112	5.(174)	159	8.(130)	206	13.(258)	253	26.(249)	300	79.(133)	347	180.(312)
19	2.(150)	66	3.(125)	113	5.(284)	160	8.(247)	207	13.(70)	254	27.(273)	301	80.(322)	348	181.(42)
20	2.(334)	67	3.(86)	114	5.(20)	161	8.(197)	208	13.(236)	255	27.(36)	302	82.(323)	349	182.(201)
21	2.(72)	68	3.(250)	115	5.(332)	162	8.(313)	209	14.(260)	256	31.(229)	303	83.(80)	350	186.(178)
22	2.(85)	69	3.(65)	116	5.(111)	163	8.(306)	210	14.(175)	257	31.(337)	304	83.(309)	351	198.(207)
23	2.(92)	70	3.(15)	117	5.(14)	164	8.(292)	211	14.(192)	258	32.(252)	305	84.(167)	352	202.(283)
24	2.(122)	71	4.(126)	118	5.(180)	165	8.(177)	212	14.(136)	259	32.(227)	306	86.(100)	353	206.(149)
25	2.(101)	72	4.(353)	119	5.(347)	166	8.(51)	213	14.(155)	260	33.(45)	307	86.(278)	354	220.(81)
26	2.(169)	73	4.(319)	120	6.(83)	167	9.(325)	214	15.(280)	261	34.(74)	308	88.(6)	355	220.(28)
27	2.(362)	74	4.(19)	121	6.(140)	168	9.(165)	215	15.(352)	262	35.(89)	309	89.(277)	356	221.(334)
28	2.(79)	75	4.(5)	122	6.(341)	169	9.(335)	216	15.(87)	263	36.(244)	310	90.(69)	357	245.(248)
29	2.(271)	76	4.(181)	123	6.(328)	170	9.(112)	217	15.(303)	264	36.(255)	311	91.(211)	358	245.(302)
30	2.(331)	77	4.(3)	124	6.(107)	171	9.(32)	218	16.(222)	265	37.(34)	312	91.(166)	359	263.(77)
31	2.(82)	78	4.(96)	125	6.(246)	172	9.(224)	219	16.(308)	266	37.(171)	313	93.(329)	360	288.(220)
32	2.(114)	79	4.(124)	126	6.(25)	173	9.(275)	220	16.(266)	267	38.(238)	314	96.(191)	361	300.(185)
33	2.(160)	80	4.(264)	127	6.(219)	174	9.(142)	221	17.(58)	268	39.(272)	315	97.(231)	362	312.(134)
34	2.(113)	81	4.(239)	128	6.(52)	175	9.(182)	222	18.(297)	269	39.(188)	316	97.(68)	363	344.(50)
35	2.(315)	82	4.(73)	129	6.(41)	176	9.(158)	223	18.(245)	270	39.(256)	317	98.(76)	364	379.(243)
36	3.(61)	83	4.(187)	130	6.(223)	177	10.(225)	224	18.(208)	271	41.(340)	318	100.(186)	365	434.(339)
37	3.(46)	84	4.(59)	131	6.(326)	178	10.(173)	225	19.(365)	272	41.(228)	319	102.(360)		
38	3.(64)	85	4.(43)	132	6.(261)	179	10.(359)	226	19.(30)	273	41.(361)	320	104.(57)		
39	3.(128)	86	4.(103)	133	6.(60)	180	10.(189)	227	19.(209)	274	43.(194)	321	108.(1)		
40	3.(274)	87	4.(263)	134	6.(349)	181	10.(27)	228	19.(270)	275	44.(358)	322	108.(161)		
41	3.(324)	88	4.(345)	135	6.(75)	182	10.(321)	229	19.(235)	276	44.(216)	323	116.(210)		
42	3.(344)	89	4.(304)	136	6.(218)	183	10.(293)	230	19.(215)	277	45.(330)	324	117.(226)		
43	3.(26)	90	4.(39)	137	6.(267)	184	10.(135)	231	19.(31)	278	45.(139)	325	119.(90)		
44	3.(121)	91	4.(157)	138	6.(316)	185	10.(55)	232	20.(141)	279	46.(152)	326	120.(296)		
45	3.(168)	92	4.(143)	139	6.(10)	186	10.(198)	233	20.(289)	280	47.(7)	327	123.(200)		
46	3.(23)	93	4.(54)	140	7.(282)	187	11.(21)	234	20.(346)	281	47.(342)	328	124.(202)		
47	3.(11)	94	4.(232)	141	7.(301)	188	11.(104)	235	20.(93)	282	49.(307)	329	125.(206)		

GRAPH, NPLOT= 6
MAIN, KNTR = 65



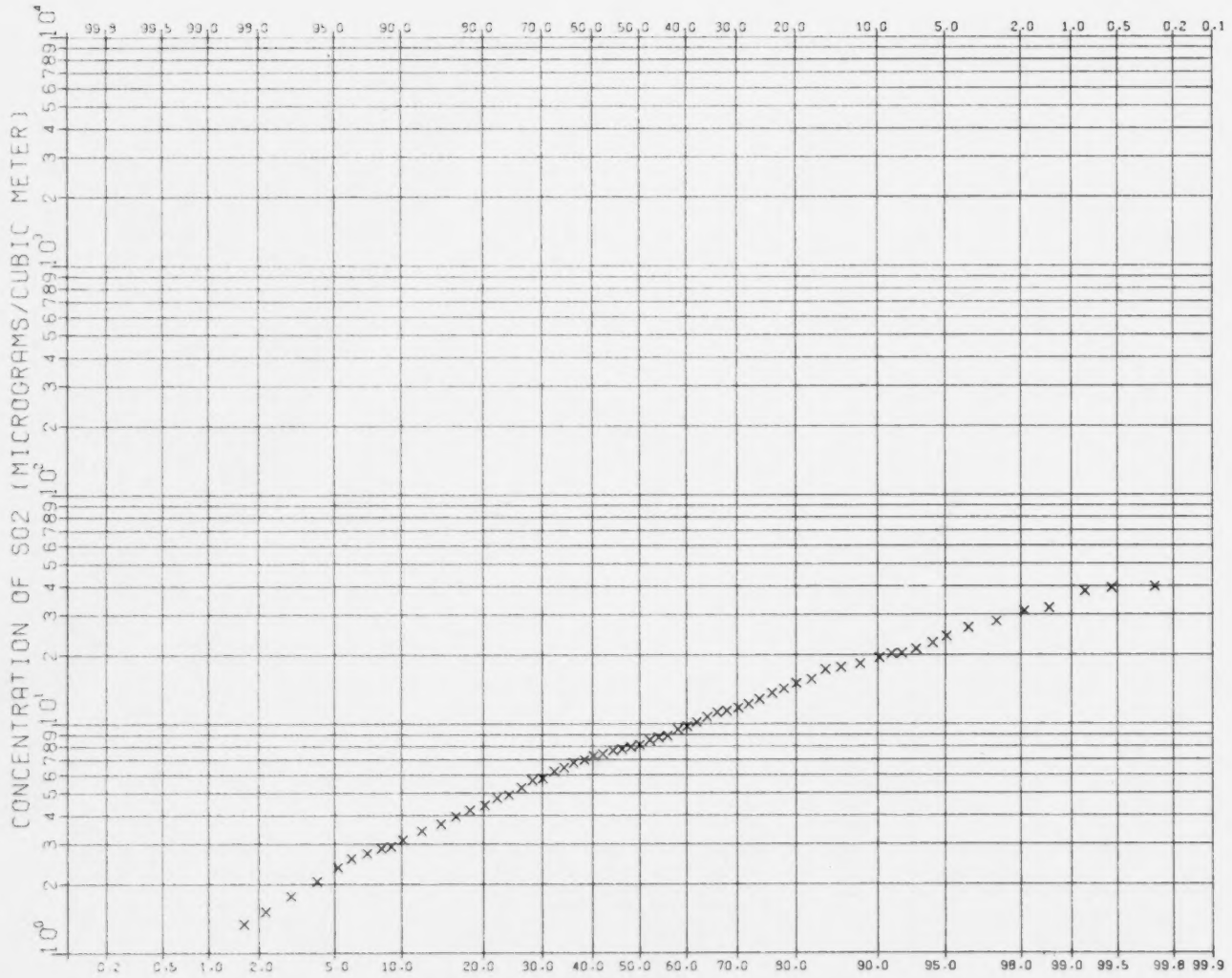
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.

RECEPTOR NO.1 LOCATED AT: (575.25,4409.00)

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)

EMISSIONS: TEST CITY, 1973

SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973



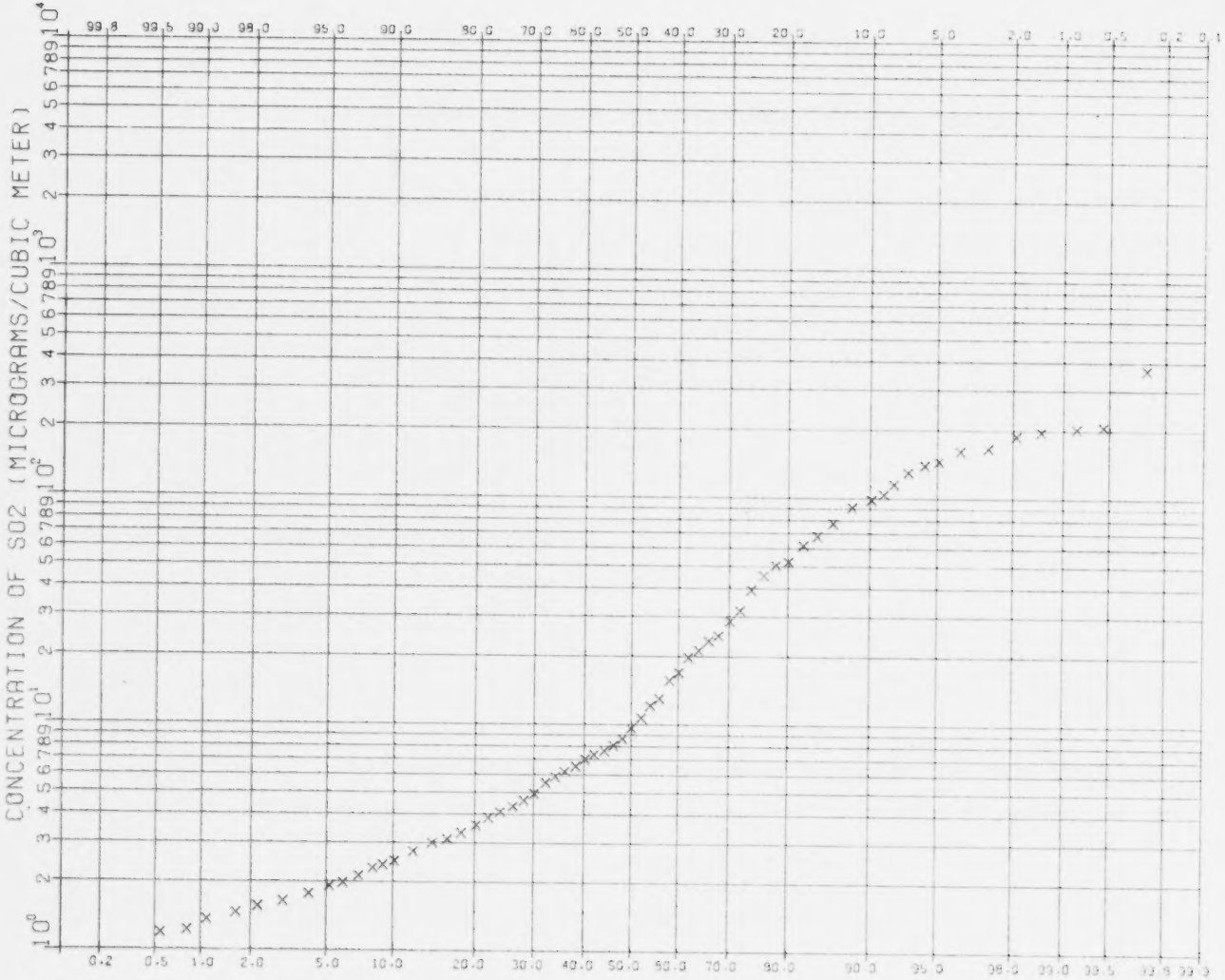
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.

RECEPTOR NO.2 LOCATED AT: (576.00,4404.00)

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)

EMISSIONS: TEST CITY, 1973

SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973



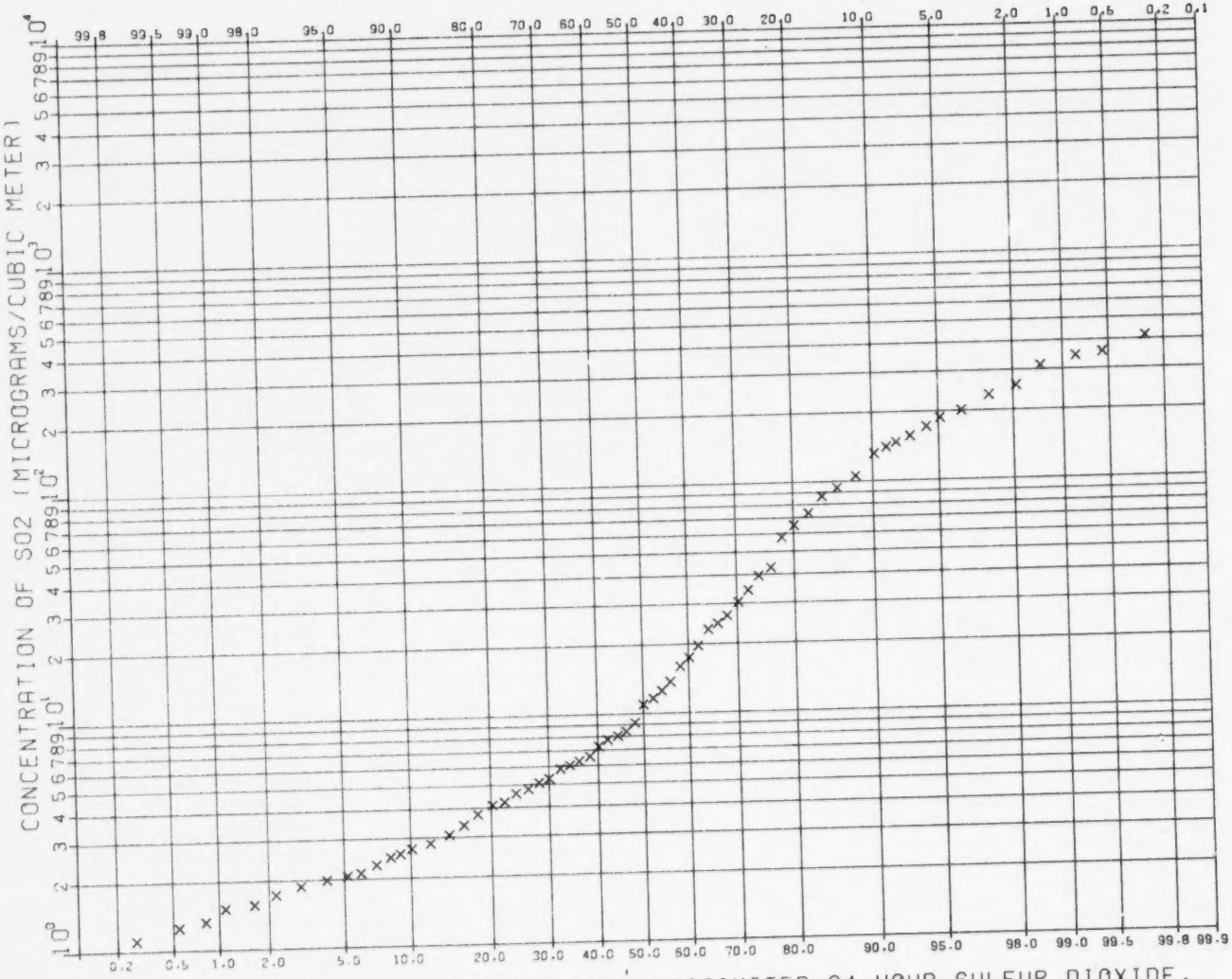
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.

RECEPTOR NO.3 LOCATED AT: (579.53,4403.10)

RUN BY: ED KRENSHA. , AIR & HAZARDOUS MATER. DIV.. REGION XV.EPA(1 JAN 78)

EMISSIONS: TEST CITY. 1973

SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973



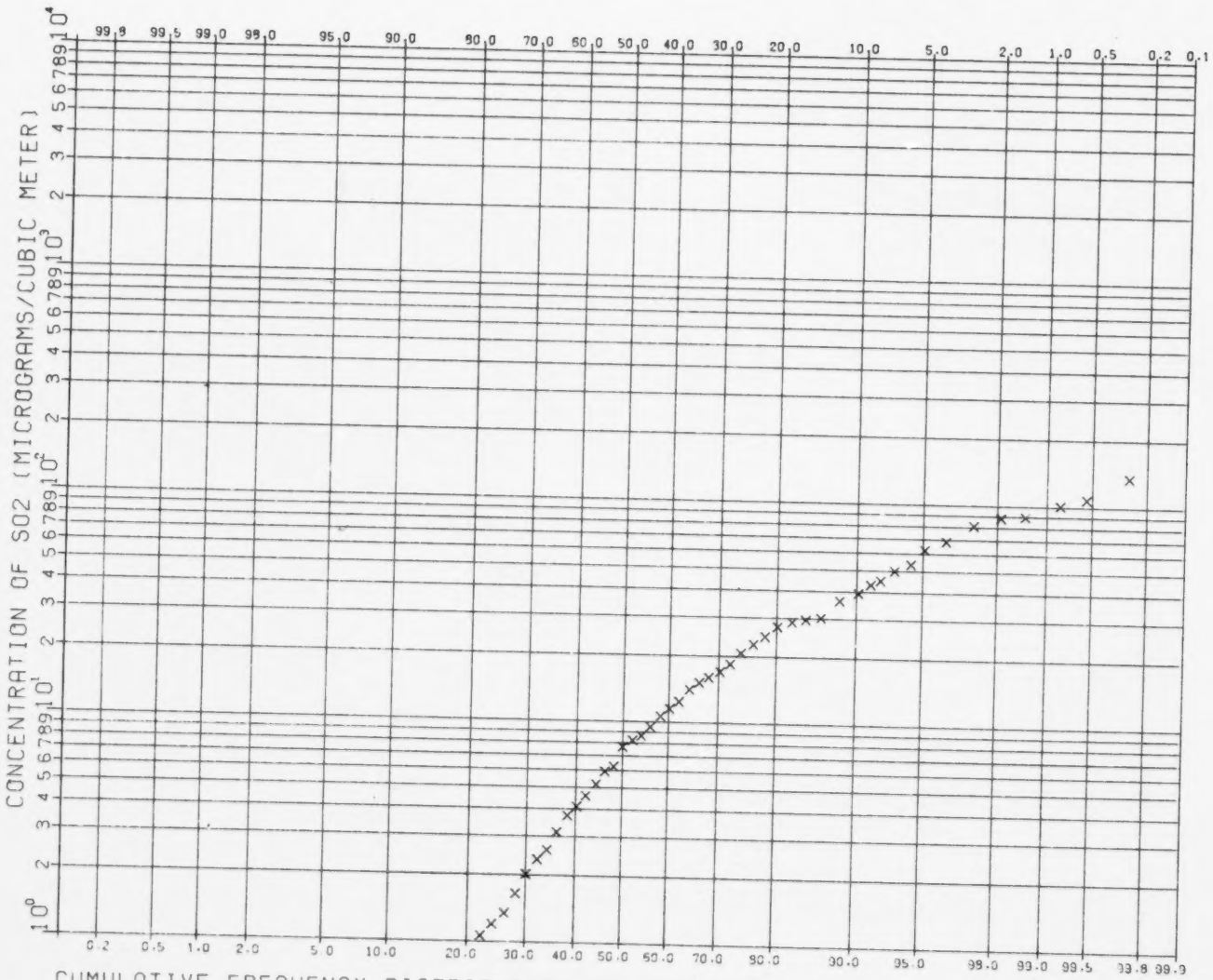
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.

RECEPTOR NO.4 LOCATED AT: (576.79,4400.56)

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)

EMISSIONS: TEST CITY, 1973

SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973



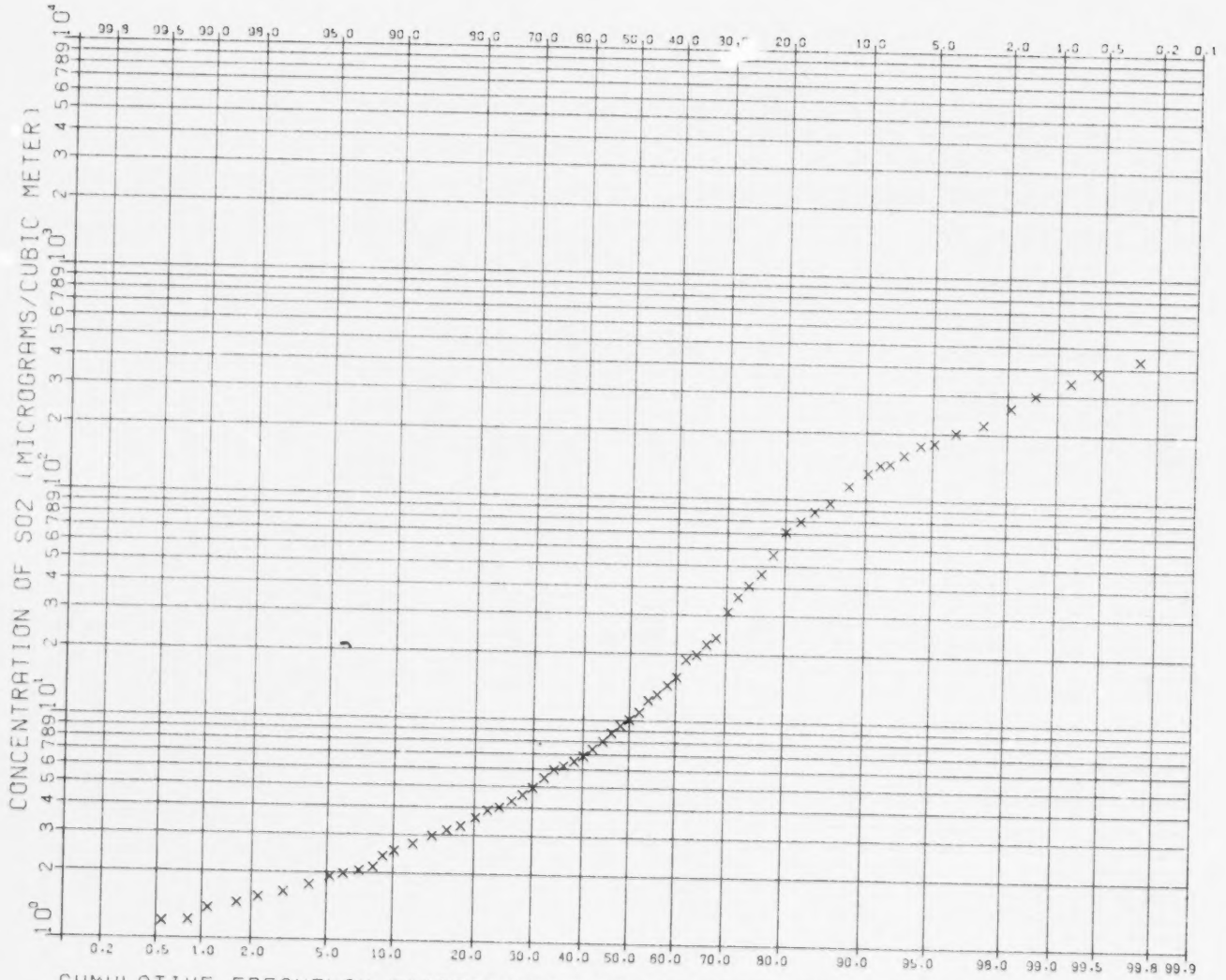
CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.

RECEPTOR NO.5 LOCATED AT: (577.29,4399.95)

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)

EMISSIONS: TEST CITY, 1973

SFC MET. DATA: TEST CITY 1973 ; UPPER AIR: TEST CITY 1973



CUMULATIVE FREQUENCY DISTRIBUTION OF ESTIMATED 24-HOUR SULFUR DIOXIDE.

RECEPTOR NO.6 LOCATED AT: (579.53,4403.16)

RUN BY: ED KRENSHAW, AIR & HAZARDOUS MATER. DIV., REGION XV,EPA(1 JAN 78)

EMISSIONS: TEST CITY, 1973

SFC MET. DATA: TEST CITY 1973 : UPPER AIR: TEST CITY 1973

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C         PROGRAM TO PRODUCE CUMULATIVE FREQUENCY DISTRIBUTIONS AND      CUMF0010
C          PLOT DIAGRAMS. INPUT DATA IS FROM A RUN OF THE FREQUENCY      CUMF0020
C           VERSION OF RAM(EITHER RAMF OR RAMFR)  - VERSION 78124        CUMF0030
C***THE PLOT OUTPUT IS INTENDED FOR A CALCOMP PLOTTER                    CUMF0040
C   TWO SUBROUTINES ARE REQUIRED:                                        CUMF0050
C      1)GRAPH                                                           CUMF0060
C      2)PROB                                                            CUMF0070
      DIMENSION CON(370), F(83), ND(370), XE(40), YN(40)                 CUMF0080
      DIMENSION FA(370), CONC(100), FREQ(100), CJI(3gg5mjk               CUMF0090
      DIMENSION FQ(400), CHI(400), TITLE(14)                             CUMF0100
      DIMENSION TLN1(14), TLN2(14), TLN3(14)                             CUMF0110
      DIMENSION HD1(2), HD2(3)                                           CUMF0120
      DATA F /0.0001,0.0002,0.0003,0.0005,0.0007,0.001,0.002,0.003,0.004CUMF0130
     1,0.005,0.007,0.01,0.015,0.02,0.03,0.04,0.05,0.06,0.07,0.08,0.09,0.CUMF0140
     210,0.12,0.14,0.16,0.18,0.20,0.22,0.24,0.26,0.28,0.30,0.32,0.34,0.3CUMF0150
     36,0.38,0.40,0.42,0.44,0.46,0.48,0.50,0.52,0.54,0.56,0.58,0.60,0.62CUMF0160
     4,0.64,0.66,0.68,0.70,0.72,0.74,0.76,0.78,0.80,0.82,0.84,0.86,0.88,CUMF0170
     50.90,0.91,0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.985,0.99,0.993,0.99CUMF0180
     65,0.996,0.997,0.998,0.999,0.9993,0.9995,0.9997,0.9998,0.9999/     CUMF0190
      DATA HD1,HD2,HD3,HD4 /'RECEPT','OR NO.',' LOCAT','ED AT:',' ( ',',CUMF0200
     1',')'/                                                             CUMF0210
      DATA FQ,CHI, /800*1.0/                                             CUMF0220
C***INITIATE THE PLOT FILE                                               CUMF0230
      CALL PLOTS (ADUM,1,14)                                             CUMF0240
      SCALE=1.0E06                                                       CUMF0250
      IRD=5                                                              CUMF0260
      IWRI=6                                                             CUMF0270
C        READ OUTPUT FROM RAMF, NUMBER OF DAYS IN YEAR AND THREE LINES   CUMF0280
C        OF TITLES FOR BOTTOM OF PAGE.                                   CUMF0290
      READ (8) JDYR,TLN1,TLN2,TLN3                                       CUMF0300
C        READ STATION COORDINATES.                                       CUMF0310
C        READ NUMBER OF RECEPTORS, EAST COORDINATE FOR FOR ALL RECEPTORSCUMF0320
C        AND NORTH COORDINATES FOR ALL RECEPTORS.                        CUMF0330
      READ (8) IMAX,(XE(J),J=1,IMAX),(YN(J),J=1,IMAX)                   CUMF0340
      IF (IMAX.LT.40) GO TO 10                                           CUMF0350
      IMAX=40                                                            CUMF0360
      WRITE (IWRI,170)                                                   CUMF0370
10    NEND=36                                                            CUMF0380
      NBEG=37                                                            CUMF0390
      IF (JDYR.LE.365) GO TO 20                                          CUMF0400
      NEND=37                                                            CUMF0410
      NBEG=38                                                            CUMF0420
20    CONTINUE                                                           CUMF0430
C        READ CARD WITH TITLE FOR GRAPH.                                 CUMF0440
      READ (IRD,180) TITLE                                               CUMF0450
C        DETERMINE PLOTTING FREQUENCY FOR EACH DAY.                      CUMF0460
      DENOM=JDYR+1                                                       CUMF0470
      DO 30 M=1,JDYR                                                     CUMF0480
      D=M                                                                CUMF0490
30    FA(M)=D/DENOM                                                      CUMF0500
C        READ CARD WITH INFORMATION ABOUT PLOT.                          CUMF0510
      READ (IRD,190) NLOG,XDIM,YDIM,YBASE                                CUMF0520
C        NLOG IS THE NUMBER OF LOG CYCLES.                               CUMF0530
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C         XDIM, YDIM ARE X,Y DIMENSIONS OF PLOT IN INCHES.                    CUMF0540
C         YBASE IS THE LOWEST VALUE ON THE LOG SCALE.                         CUMF0550
      NPLOT=1                                                                 CUMF0560
C         READ DAILY DISK FILES, JULIAN DAY NUMBER, AND CONC. FOR EACH        CUMF0570
C         RECEPTOR.                                                           CUMF0580
      DO 40 J=1,JDYR                                                          CUMF0590
      READ (8) JDAY,(CJI(J,K),K=1,IMAX)                                       CUMF0600
C***CHECK DATE                                                                CUMF0610
      IF(JDAY.NE.J) GO TO 150                                                 CUMF0620
40    CONTINUE                                                                CUMF0630
      JM1=JDYR-1                                                              CUMF0640
C           DO FOR EACH RECEPTOR                                              CUMF0650
      DO 140 I=1,IMAX                                                         CUMF0660
      SUM=0.0                                                                 CUMF0670
      DO 50 J=1,JDYR                                                          CUMF0680
      ND(J)=J                                                                 CUMF0690
C     CONVERT THIS RECEPTOR'S CONCENTRATIONS TO MICROGRAMS PER CUBIC          CUMF0700
C      METER AND STORE IN CON.                                                CUMF0710
      CON(J)=SCALE*CJI(J,I)                                                   CUMF0720
50    SUM=SUM+CON(J)                                                          CUMF0730
C        ORDER CONCENTRATIONS FROM LOW TO HIGH.                               CUMF0740
C      DO FOR ALL THE NUMBER OF DAYS IN THE YEAR MINUS ONE.                   CUMF0750
      DO 70 M=1,JM1                                                           CUMF0760
C       SET UP A CANDIDATE MINIMUM                                            CUMF0770
      AMIN=CON(M)                                                             CUMF0780
C       L IS THE POSITION IN THE ARRAY OF THE CANDIDATE                       CUMF0790
      L=M                                                                     CUMF0800
      KBEG=M+1                                                                CUMF0810
C       DO FOR THE REST OF THE DAYS.                                          CUMF0820
      DO 60 K=KBEG,JDYR                                                       CUMF0830
      IF (CON(K).GE.AMIN) GO TO 60                                            CUMF0840
C       IF KTH CONCEN. IS LESS THAN AMIN, REPLACE AMIN.                       CUMF0850
      AMIN=CON(K)                                                             CUMF0860
C       L IS NEW CANDIDATE                                                    CUMF0870
      L=K                                                                     CUMF0880
60    CONTINUE                                                                CUMF0890
C       THE LTH CONCEN. IS THE MINIMUM OF THOSE TESTED.                       CUMF0900
      IF (L.EQ.M) GO TO 70                                                    CUMF0910
C       L=M, NO NEED FOR EXCHANGE                                             CUMF0920
C       EXCHANGE LTH AND MTH CON'S AND NOS.                                   CUMF0930
      CON(L)=CON(M)                                                           CUMF0940
      CON(M)=AMIN                                                             CUMF0950
      N=ND(L)                                                                 CUMF0960
      ND(L)=ND(M)                                                             CUMF0970
      ND(M)=N                                                                 CUMF0980
70    CONTINUE                                                                CUMF0990
C        HAVE DAILY CONCENTRATIONS RANKED FROM LOWEST TO HIGHEST IN           CUMF1000
C        ARRAY CON.  HAVE ORIGINAL DAY NUMBERS IN ARRAY: ND.                  CUMF1010
C     DETERMINE ANNUAL AVERAGE CONCENTRATION                                  CUMF1020
      SUM=SUM/JDYR                                                            CUMF1030
C        PRINT PAGE OF CUMULATIVE FREQUENCY DISTRIBUTION.                     CUMF1040
      WRITE (IWRI,200) TLN1,TLN2,TLN3                                         CUMF1050
      WRITE (IWRI,210) I,XE(I),YN(I),SUM                                      CUMF1060
      DO 80 NA=1,NEND                                                         CUMF1070
      N2=NA+47                                                                CUMF1080
      N3=NA+94                                                                CUMF1090
      N4=NA+141                                                               CUMF1100
      N5=NA+188                                                               CUMF1110
      N6=NA+235                                                               CUMF1120
      N7=NA+282                                                               CUMF1130
      N8=NA+329                                                               CUMF1140
80    WRITE (IWRI,220) NA,CON(NA),ND(NA),N2,CON(N2),ND(N2),N3,CON(N3),NDCUMF1150
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     1(N3),N4,CON(N4),ND(N4),N5,CON(N5),ND(N5),N6,CON(N6),ND(N6),N7,CON(CUMF1160
     2N7),ND(N7),N8,CON(N8),ND(N8)                                      CUMF1170
      DO 90 NA=NBEG,47                                                  CUMF1180
      N2=NA+47                                                          CUMF1190
      N3=NA+94                                                          CUMF1200
      N4=NA+141                                                         CUMF1210
      N5=NA+188                                                         CUMF1220
      N6=NA+235                                                         CUMF1230
      N7=NA+282                                                         CUMF1240
90    WRITE (IWRI,220) NA,CON(NA),ND(NA),N2,CON(N2),ND(N2),N3,CON(N3),NDCUMF1250
     1(N3),N4,CON(N4),ND(N4),N5,CON(N5),ND(N5),N6,CON(N6),ND(N6),N7,CON(CUMF1260
     2N7),ND(N7)                                                        CUMF1270
C        LN IS COUNT OF CONCENTRATIONS STORED.                          CUMF1280
      LF=1                                                              CUMF1290
      LN=0                                                              CUMF1300
C        STORE ENOUGH CONCENTRATIONS AND FREQUENCIES TO                 CUMF1310
C        PLOT A REPRESENTATIVE CUMULATIVE FREQUENCY                     CUMF1320
C        WITHOUT PLOTTING EVERY DAY OF THE YEAR.                        CUMF1330
      DO 110 M=1,JDYR                                                   CUMF1340
      IF (FA(M).LT.F(LF)) GO TO 110                                     CUMF1350
100   LF=LF+1                                                           CUMF1360
      IF (FA(M).GE.F(LF)) GO TO 100                                     CUMF1370
      LN=LN+1                                                           CUMF1380
      CONC(LN)=CON(M)                                                   CUMF1390
      FREQ(LN)=FA(M)                                                    CUMF1400
110   CONTINUE                                                          CUMF1410
C        HAVE LN CONCENTRATIONS AND FREQUENCIES STORED FOR PLOTTING.    CUMF1420
C        PLOTTER PROGRAM TO PRODUCE LOG-PROBABILITY PLOTS.              CUMF1430
C        NPLOT IS THE NUMBER OF SIDE BY SIDE PLOTS ON THE PLOTTING PAPERCUMF1440
C        SUBROUTINE GRAPH DRAWS THE LOG-PROBABILITY CHART.              CUMF1450
      CALL GRAPH (XDIM,YDIM,NLOG,YBASE,NPLOT)                           CUMF1460
C        TEST IS THE HIGHEST Y-VALUE THAT CAN BE PLOTTED.               CUMF1470
      TEST=ALOG10(YBASE)+NLOG*1.0                                       CUMF1480
      TEST=10.0**TEST                                                   CUMF1490
      STA=I                                                             CUMF1500
      R=XE(I)                                                           CUMF1510
      S=YN(I)                                                           CUMF1520
C      WRITE LEGENDS AT BOTTOM INCLUDING RECEPTOR NUMBER AND COORDINATESCUMF1530
      CALL SYMBOL (0.0,-0.5,0.14,TITLE,0.0,80)                          CUMF1540
      CALL SYMBOL (0.0,-.85,0.12,HD1,0.0,12)                            CUMF1550
      CALL NUMBER (999.0,-.85,0.12,STA,0.0,-1)                          CUMF1560
      CALL SYMBOL (999.0,-.85,0.12,HD2,0.0,14)                          CUMF1570
      CALL NUMBER (999.0,-.85,0.12,R,0.0,2)                             CUMF1580
      CALL SYMBOL (999.0,-.85,0.12,HD3,0.0,1)                           CUMF1590
      CALL NUMBER (999.0,-.85,0.12,S,0.0,2)                             CUMF1600
      CALL SYMBOL (999.0,-.85,0.12,HD4,0.0,1)                           CUMF1610
      CALL SYMBOL (0.0,-1.2,0.12,TLN1,0.0,80)                           CUMF1620
      CALL SYMBOL (0.0,-1.55,0.12,TLN2,0.0,80)                          CUMF1630
      CALL SYMBOL (0.0,-1.9,0.12,TLN3,0.0,80)                           CUMF1640
C        INT1 IS SYMBOL CODE FOR X.                                     CUMF1650
      INT1=4                                                            CUMF1660
      KNTR=0                                                            CUMF1670
C         DETERMINE PLOTTING POSITION FQ, CHI FOR EACH POINT.           CUMF1680
      DO 120 K=1,LN                                                     CUMF1690
      A=FREQ(K)                                                         CUMF1700
      B=CONC(K)                                                         CUMF1710
C        CONC. WITHIN LIMITS OF GRAPH.                                  CUMF1720
      IF (B.LT.YBASE.OR.B.GT.TEST) GO TO 120                            CUMF1730
C        INCREMENT COUNT AND DETERMINE X AND Y PLOTTING POSITIONS.      CUMF1740
      KNTR=KNTR+1                                                       CUMF1750
C        FUNCTION PROB DETERMINES PROBABILITY PLOTTING POSITION.        CUMF1760
      FQ(KNTR)=PROB(A)                                                  CUMF1770
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      CHI(KNTR)=ALOG10(B)                                              CUMF1780
120   CONTINUE                                                         CUMF1790
      FQ(KNTR+1)=PROB(0.001)                                           CUMF1800
      FQ(KNTR+2)=(PROB(0.999)-PROB(0.001))/XDIM                        CUMF1810
      PRINT 230, KNTR                                                  CUMF1820
      CHI(KNTR+1)=ALOG10(YBASE)                                        CUMF1830
      CHI(KNTR+2)=NLOG/YDIM                                            CUMF1840
C        PLOT POINTS.                                                  CUMF1850
      CALL PLOT (0.,0.,-3)                                             CUMF1860
      CALL LINE (FQ,CHI,KNTR,1,-1,INT1)                                CUMF1870
      DO 130 J=1,400                                                   CUMF1880
      CHI(J)=1.0                                                       CUMF1890
130   FQ(J)=1.0                                                        CUMF1900
      NPLOT=NPLOT+1                                                    CUMF1910
140   CONTINUE                                                         CUMF1920
C        END OF RECEPTOR LOOP.                                         CUMF1930
      CALL PLOT ((XDIM/2.+12.),0.,999)                                 CUMF1940
      GO TO 160                                                        CUMF1950
150   WRITE (IWRI,240) JDAY,J                                          CUMF1960
160   CALL EXIT                                                        CUMF1970
C                                                                      CUMF1980
170   FORMAT ('1 IMAX EXCEEDS 40. RESET TO 40.')                       CUMF1990
180   FORMAT (13A6,A2)                                                 CUMF2000
190   FORMAT (I3,3F5.0)                                                CUMF2010
200   FORMAT (1H1,13A6,A2/1X,13A6,A2/1X,13A6,A2)                       CUMF2020
210   FORMAT (1H0,'CUMULATIVE FREQUENCY DISTRIBUTION FOR STATION',I3,' ACUMF2030
     1T',F9.3,',',F9.3,' ANNUAL CONC. =',F9.1,' MICROGRAMS/CUBIC METER.'CUMF2040
     2/)                                                               CUMF2050
220   FORMAT (1H ,8(I5,F6.0,'(',I3,')'))                               CUMF2060
230   FORMAT (2X,' MAIN, KNTR =',I10)                                  CUMF2070
240   FORMAT (2I10)                                                    CUMF2080
C                                                                      CUMF2090
      END                                                              CUMF2100
```

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      SUBROUTINE GRAPH(XDIM,YDIM,NLOG,YBASE,NPLOT)                     GRAPH010
C        GRAPH DRAWS THE BASE CHART WITH PROBABILITY SCALE ON THE      GRAPH020
C        ABSCISSA AND LOG SCALE ON THE ORDINATE. THIS ROUTINE WAS      GRAPH030
C        DEVELOPED BY DALE COVENTRY.                                   GRAPH040
      DIMENSION XVAL(21),TEXT(8)                                       GRAPH050
      DATA XVAL/0.1,0.2,0.5,1.0,2.0,5.0,10.0,20.0,30.0,40.0,50.0,60.0, GRAPH060
     U 70.0,80.0,90.0,95.0,98.0,99.0,99.5,99.8,99.9/                   GRAPH070
      DATA TEXT/'CONCEN','TRATIO','N OF S','02 (MI',                   GRAPH080
     *'CROGRA','MS/CUB','IC MET','ER)   '/                             GRAPH090
200   FORMAT(1H0,' GRAPH, NPLOT=',I10)                                 GRAPH100
      IF(NPLOT.GT.1)GO TO 17                                           GRAPH110
C        SET TO BASE PLOTTER POSITION AT BOTTOM OF PAGE.               GRAPH120
      CALL PLOT(12.0,-36.0,3)                                          GRAPH130
      CALL PLOT((XDIM/2.),-33.0,-3)                                    GRAPH140
      FCTR=ABS((XDIM/2.)/PROB(0.001))                                  GRAPH150
      GO TO 18                                                         GRAPH160
17    ICHECK=MOD(NPLOT,3)                                              GRAPH170
C        GO TO CORRECT POSITION FOR MODULUS 3 OF PLOT NUMBER           GRAPH180
C        (THREE PLOTS ARE MADE ACROSS WIDTH OF PAPER.)                 GRAPH190
      IF(ICHECK.EQ.0)CALL PLOT(5.,11.,-3)                              GRAPH200
      IF(ICHECK.EQ.1)CALL PLOT(17.,-22.,-3)                            GRAPH210
      IF(ICHECK.EQ.2)CALL PLOT(5.,11.,-3)                              GRAPH220
18    M=-1                                                             GRAPH230
C        INDICATE ON PRINTER THAT PLOT IS BEING ATTEMPTED.             GRAPH240
      WRITE(6,200) NPLOT                                               GRAPH250
```

```
C       POSITION AT CENTER OF PLOT                                      GRAPH260
        CALL SYMBOL((-XDIM/2.),0.0,0.1,13,0.0,-1)                       GRAPH270
C       DRAW CENTER LINE                                                GRAPH280
        CALL PLOT((-XDIM/2.),0.0,3)                                     GRAPH290
        CALL PLOT((-XDIM/2.),YDIM,2)                                    GRAPH300
        CALL SYMBOL((-XDIM/2.),YDIM,0.1,13,0.0,-1)                      GRAPH310
C       LOOP TO DRAW LINES AND PLOT TOP AND BOTTOM NUMBERS FOR          GRAPH320
C       PROBABILITY PART OF GRAPH.                                      GRAPH330
        DO 2 I=2,21                                                     GRAPH340
        M=M*(-1)                                                        GRAPH350
C       M IS A 'FLIP-FLOP' SWITCH TO GO FROM TOP TO BOTTOM, THEN BOTTOMGRAPH360
C       TO TOP, ETC.                                                    GRAPH370
        ANUM=XVAL(I)                                                    GRAPH380
        BNUM=100.0-XVAL(I)                                              GRAPH390
        CNUM=XVAL(I)*0.01                                               GRAPH400
C       DETERMINE LINE POSITION                                         GRAPH410
        XP=PROB(CNUM)*FCTR                                              GRAPH420
        IF(M.LT.0)GO TO 1                                               GRAPH430
        IF(ANUM.LT.10.)GO TO 11                                         GRAPH440
        CALL NUMBER((XP-0.17),-0.15,0.07,ANUM,0.0,1)                    GRAPH450
        GO TO 12                                                        GRAPH460
11      CALL NUMBER((XP-0.07),-0.15,0.07,ANUM,0.0,1)                    GRAPH470
12      CALL SYMBOL(XP,0.0,0.1,13,0.0,-1)                               GRAPH480
        CALL PLOT(XP,0.0,3)                                             GRAPH490
        CALL PLOT(XP,YDIM,2)                                            GRAPH500
        CALL SYMBOL(XP,YDIM,0.1,13,0.0,-1)                              GRAPH510
        IF(BNUM.LT.10.)GO TO 13                                         GRAPH520
        CALL NUMBER((XP-0.17),(YDIM+0.05),0.07,BNUM,0.0,1)              GRAPH530
        GO TO 2                                                         GRAPH540
13      CALL NUMBER((XP-0.07),(YDIM+0.05),0.07,BNUM,0.0,1)              GRAPH550
        GO TO 2                                                         GRAPH560
1       IF(BNUM.LT.10.)GO TO 14                                         GRAPH570
        CALL NUMBER((XP-0.17),(YDIM+0.05),0.07,BNUM,0.0,1)              GRAPH580
        GO TO 15                                                        GRAPH590
14      CALL NUMBER((XP-0.07),(YDIM+0.05),0.07,BNUM,0.0,1)              GRAPH600
15      CALL SYMBOL(XP,YDIM,0.1,13,0.0,-1)                              GRAPH610
        CALL PLOT(XP,YDIM,3)                                            GRAPH620
        CALL PLOT(XP,0.0,2)                                             GRAPH630
        CALL SYMBOL(XP,0.0,0.1,13,0.0,-1)                               GRAPH640
        IF(ANUM.LT.10.)GO TO 16                                         GRAPH650
        CALL NUMBER((XP-0.17),-0.15,0.07,ANUM,0.0,1)                    GRAPH660
        GO TO 2                                                         GRAPH670
16      CALL NUMBER((XP-0.07),-0.15,0.07,ANUM,0.0,1)                    GRAPH680
2       CONTINUE                                                        GRAPH690
C       WRITE ORDINATE LEGEND.(TEXT AND NUMBERS)                        GRAPH700
        CALL LGAXS((XDIM/(-2.)),0.0,TEXT,48,YDIM,90.,YBASE,(NLOG/YDIM)) GRAPH710
        XPLOT=XDIM/2.0                                                  GRAPH720
        ZPLOT=-1.0*XPLOT                                                GRAPH730
        M=-1                                                            GRAPH740
C       LOOP TO DRAW LINES OF LOG PART OF GRAPH                         GRAPH750
        DO 4 I=1,NLOG                                                   GRAPH760
        DO 4 J=1,9                                                      GRAPH770
        AJ=J                                                            GRAPH780
C       'FLIP-FLOP' TO GO FROM LEFT TO RIGHT, THEN RIGHT TO LEFT, ETC.  GRAPH790
        M=M*(-1)                                                        GRAPH800
        YPLOT=(I-1)*(YDIM/NLOG)+ALOG10(AJ)*(YDIM/NLOG)                  GRAPH810
        IF(M.LT.0)GO TO 3                                               GRAPH820
        CALL PLOT(XPLOT,YPLOT,3)                                        GRAPH830
        CALL PLOT(ZPLOT,YPLOT,2)                                        GRAPH840
        GO TO 4                                                         GRAPH850
3       CALL PLOT(ZPLOT,YPLOT,3)                                        GRAPH860
        CALL PLOT(XPLOT,YPLOT,2)                                        GRAPH870
```

```
4       CONTINUE                                                        GRAPH880
C          DRAW TOP LINE                                                GRAPH890
        IF(M.LT.0)GO TO 30                                              GRAPH900
        CALL PLOT(XPLOT,YDIM,3)                                         GRAPH910
        CALL PLOT(ZPLOT,YDIM,2)                                         GRAPH920
        GO TO 31                                                        GRAPH930
30      CALL PLOT(ZPLOT,YDIM,3)                                         GRAPH940
        CALL PLOT(XPLOT,YDIM,2)                                         GRAPH950
31      CALL PLOT(ZPLOT,0.0,-3)                                         GRAPH960
        RETURN                                                          GRAPH970
        END                                                             GRAPH980
```

```
        FUNCTION PROB(Z)                                                PROB0010
C***THE FUNCTION PROB(Z) TAKES THE INPUT Z IN FREQUENCY                 PROB0020
C***FROM 0 TO 1.0 AND DETERMINES THE PLUS OR MINUS                      PROB0030
C***STANDARD DEVIATIONS(PROB) ON THE NORMAL CURVE OF                    PROB0040
C***FREQUENCY THUS GIVING A PLOTTING POSITION FOR GRAPHING              PROB0050
C***ON THE PROBABILITY SCALE.                                           PROB0060
C***THIS SUBROUTINE WAS DEVELOPED BY JOE SANTNER AND OBTAINED           PROB0070
C***FROM RALPH LARSEN.                                                  PROB0080
        W(A)=SQRT(ALOG(1./(A*A)))                                       PROB0090
        X(A)=W(A)-((2.515517+0.802853*W(A)+0.010328*(W(A)*W(A)))/(1.+   PROB0100
       1 1.432788*W(A)+0.189269*(W(A)*W(A))+0.001308*(W(A)*W(A)*W(A)))) PROB0110
        IF(Z-0.5)1,7,8                                                  PROB0120
1       IF(Z-0.0)2,4,6                                                  PROB0130
2       WRITE(6,3)Z                                                     PROB0140
3       FORMAT(2X,'INPUT ERROR PROB =',E20.10)                          PROB0150
        GO TO 10                                                        PROB0160
4       WRITE(6,5)Z                                                     PROB0170
5       FORMAT(2X,'ANS DEVIA EQUAL MINUS OR PLUS INFINITY PROB =',E17.10) PROB0180
        GO TO 10                                                        PROB0190
6       PROB=-X(Z)                                                      PROB0200
        GO TO 10                                                        PROB0210
7       PROB=0.0                                                        PROB0220
        GO TO 10                                                        PROB0230
8       IF(Z-1.0)9,4,2                                                  PROB0240
9       PROB=X(1.0-Z)                                                   PROB0250
10      RETURN                                                          PROB0260
        END                                                             PROB0270
```

10. RAMBLK - INPUT FORMATS AND EXAMPLE RUNSTEAMS

RAMBLK

RAMBLK WAS EXECUTED TO PRODUCE THE BLOCK DATA SUBROUTINES FOR BOTH THE RURAL AND URBAN VERSIONS OF RAM. IF THE USER WISHES TO USE AN ALTERNATE METHOD OF CALCULATING THE DISPERSION PARAMETERS, HE SHOULD REPLACE EITHER THE RURAL DISPERSION ROUTINES, PGSYSZ AND PGSZ, OR THE URBAN DISPERSION ROUTINES, BRSYSZ AND BRSZ, WITH HIS OWN SUBROUTINES WHICH WILL CALCULATE THE APPROPRIATE DISPERSION PARAMETERS. THE BLOCK DATA SUBROUTINE PRODUCED BY RAMBLK MUST THEN REPLACE THE CURRENT BLOCK DATA SUBROUTINES IN THE APPROPRIATE RAM VERSIONS. RAMQ REQUIRES BLOCK DATA ROUTINES FOR BOTH RURAL AND URBAN DISPERSION PARAMETERS, THEREFORE SOME MODIFICATION OF THE ARRAY NAMES IN THE RURAL BLOCK DATA SUBROUTINE ARE NECESSARY.(SPECIFICALLY, CHANGE THE LAST LETTER OF EACH ARRAY NAME AND THE COMMON AREA NAME TO AN 'R'. ALSO CHANGE THE LAST LETTER OF THE URBAN COMMON AREA NAME TO A 'U'). ALSO ANY CALLS TO THE SIGMA ROUTINES IN THE MODEL MUST BE CHANGED IF DIFFERENT SUBROUTINE NAMES ARE USED. SEE THE CURRENT RAMQDOC FOR EXAMPLES.

***** CARD INPUT TO RAMBLK *****
CARD 1 (I1) IMOD
IMOD=1 TO USE RURAL SIGMA SUBROUTINES
IMOD=2 TO USE URBAN SIGMA SUBROUTINES
EXAMPLE:

```
2
```

THE FOLLOWING ECL STREAM IS NEEDED TO EXECUTE RAMBLK USING URBAN DISPERSION SUBROUTINES. A CARD DECK OF THE URBAN BLOCK DATA SUBROUTINE IS GENERATED.

******EXAMPLE ECL STREAM******

```
@RUN,D/R JOBNAME/13,ACCNT-NO/USERID,PROJ-ID,1,25/100
@PASSWD PASSWORD
@XQT A999*UNAMAP.RAMBLK
2

C*************************************************************************************
```

THE PRECEEDING RUN STREAM HAD A RUN TIME OF 11.89 SECONDS ON THE UNIVAC 1110 AND REQUIRED 11K WORDS OF MEMORY(APPROXIMATELY 7,038 WORDS OF INSTRUCTION AND 3,957 WORDS FOR DATA)

****
*
* EXAMPLE PRINTOUT FROM RAMBLK *
*
****

URBAN POINT SOURCES.

STAB = 1, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .17920798-02,DIST. OF MAX = .0290 KM.
STAB = 1, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .45675026-03,DIST. OF MAX = .0580 KM.
STAB = 1, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .20677530-03,DIST. OF MAX = .0860 KM.
STAB = 1, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .77062745-04,DIST. OF MAX = .1410 KM.
STAB = 1, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .40601150-04,DIST. OF MAX = .1940 KM.
STAB = 1, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .20794597-04,DIST. OF MAX = .2710 KM.
STAB = 1, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .58781114-05,DIST. OF MAX = .5080 KM.
STAB = 1, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .28808163-05,DIST. OF MAX = .7230 KM.
STAB = 1, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .12076918-05,DIST. OF MAX = 1.1100 KM.
STAB = 1, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .39061724-06,DIST. OF MAX = 1.9310 KM.
STAB = 2, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .17920798-02,DIST. OF MAX = .0290 KM.
STAB = 2, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .45675026-03,DIST. OF MAX = .0580 KM.
STAB = 2, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .20677530-03,DIST. OF MAX = .0860 KM.
STAB = 2, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .77062745-04,DIST. OF MAX = .1410 KM.
STAB = 2, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .40601150-04,DIST. OF MAX = .1940 KM.
STAB = 2, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .20794597-04,DIST. OF MAX = .2710 KM.
STAB = 2, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .58781114-05,DIST. OF MAX = .5080 KM.
STAB = 2, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .28808163-05,DIST. OF MAX = .7230 KM.
STAB = 2, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .12076918-05,DIST. OF MAX = 1.1100 KM.
STAB = 2, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .39061724-06,DIST. OF MAX = 1.9310 KM.
STAB = 3, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .21434982-02,DIST. OF MAX = .0350 KM.
STAB = 3, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .53975903-03,DIST. OF MAX = .0710 KM.
STAB = 3, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .24153771-03,DIST. OF MAX = .1070 KM.
STAB = 3, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .88134811-04,DIST. OF MAX = .1780 KM.
STAB = 3, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .45562290-04,DIST. OF MAX = .2500 KM.
STAB = 3, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .22757757-04,DIST. OF MAX = .3590 KM.
STAB = 3, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .60382025-05,DIST. OF MAX = .7280 KM.
STAB = 3, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .28314999-05,DIST. OF MAX = 1.1040 KM.
STAB = 3, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .11191253-05,DIST. OF MAX = 1.8710 KM.
STAB = 3, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .33469894-06,DIST. OF MAX = 3.9380 KM.
STAB = 4, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .20543680-02,DIST. OF MAX = .0510 KM.
STAB = 4, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .51464594-03,DIST. OF MAX = .1030 KM.
STAB = 4, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .22937401-03,DIST. OF MAX = .1550 KM.
STAB = 4, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .82961757-04,DIST. OF MAX = .2630 KM.
STAB = 4, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .42517904-04,DIST. OF MAX = .3740 KM.
STAB = 4, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .20967885-04,DIST. OF MAX = .5480 KM.
STAB = 4, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .53417623-05,DIST. OF MAX = 1.1860 KM.
STAB = 4, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .24112443-05,DIST. OF MAX = 1.9230 KM.
STAB = 4, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .98855745-06,DIST. OF MAX = 3.7180 KM.
STAB = 4, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .29925020-06,DIST. OF MAX = 10.3270 KM.
STAB = 5, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .16243314-02,DIST. OF MAX = .0930 KM.
STAB = 5, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .38822337-03,DIST. OF MAX = .1970 KM.
STAB = 5, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16536934-03,DIST. OF MAX = .3120 KM.
STAB = 5, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .55108894-04,DIST. OF MAX = .5780 KM.
STAB = 5, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .26293411-04,DIST. OF MAX = .9010 KM.
STAB = 5, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .11860622-04,DIST. OF MAX = 1.5070 KM.
STAB = 5, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .25264018-05,DIST. OF MAX = 4.8570 KM.
STAB = 5, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .10521423-05,DIST. OF MAX = 10.5540 KM.
STAB = 5, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .36234108-06,DIST. OF MAX = 29.1530 KM.
STAB = 5, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .88636659-07,DIST. OF MAX = 116.9790 KM.
STAB = 6, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .16243314-02,DIST. OF MAX = .0930 KM.
STAB = 6, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .38822337-03,DIST. OF MAX = .1970 KM.
STAB = 6, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16536934-03,DIST. OF MAX = .3120 KM.
STAB = 6, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .55108894-04,DIST. OF MAX = .5780 KM.
STAB = 6, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .26293411-04,DIST. OF MAX = .9010 KM.
STAB = 6, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .11860622-04,DIST. OF MAX = 1.5070 KM.
STAB = 6, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .25264018-05,DIST. OF MAX = 4.8570 KM.
STAB = 6, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .10521423-05,DIST. OF MAX = 10.5540 KM.
STAB = 6, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .36234108-06,DIST. OF MAX = 29.1530 KM.
STAB = 6, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .88636659-07,DIST. OF MAX = 116.9790 KM.

THESE COEFFICIENTS AND EXPONENTS WERE GENERATED USING THE URBAN DISPERSION SUBROUTINES.

POINT SOURCE
CONCENTRATION COEFFICIENT MATRIX

HEIGHT(M)	STABILITY 1	2	3	4	5	6
10. - 20.	.1680795+00	.1680795+00	.2092681+00	.2037793+00	.1886087+00	.1886087+00
20. - 30.	.1594464+00	.1594464+00	.2052743+00	.2022943+00	.2125272+00	.2125272+00
30. - 50.	.1477676+00	.1477676+00	.1987056+00	.2001070+00	.2488781+00	.2488781+00
50. - 70.	.1326155+00	.1326155+00	.1890827+00	.1968549+00	.3004090+00	.3004090+00
70. - 100.	.1174476+00	.1174476+00	.1776665+00	.1930077+00	.3452114+00	.3452114+00
100. - 200.	.9194300-01	.9194300-01	.1532724+00	.1849872+00	.3436803+00	.3436803+00
200. - 300.	.6553273-01	.6553273-01	.1198430+00	.1744547+00	.2364028+00	.2364028+00
300. - 500.	.4734490-01	.4734490-01	.8982097-01	.1672027+00	.1553691+00	.1553691+00
500. -1000.	.2999340-01	.2999340-01	.5609996-01	.1674694+00	.1100861+00	.1100861+00

CONCENTRATION EXPONENT MATRIX

HEIGHT(M)	STABILITY 1	2	3	4	5	6
10. - 20.	-.1972157+01	-.1972157+01	-.1989580+01	-.1996482+01	-.2064887+01	-.2064887+01
20. - 30.	-.1954556+01	-.1954556+01	-.1983148+01	-.1994040+01	-.2104742+01	-.2104742+01
30. - 50.	-.1932191+01	-.1932191+01	-.1973586+01	-.1990844+01	-.2151165+01	-.2151165+01
50. - 70.	-.1904536+01	-.1904536+01	-.1960896+01	-.1986656+01	-.2199268+01	-.2199268+01
70. - 100.	-.1875947+01	-.1875947+01	-.1946238+01	-.1982010+01	-.2231989+01	-.2231989+01
100. - 200.	-.1822784+01	-.1822784+01	-.1914167+01	-.1972794+01	-.2231024+01	-.2231024+01
200. - 300.	-.1758873+01	-.1758873+01	-.1867731+01	-.1961729+01	-.2160402+01	-.2160402+01
300. - 500.	-.1701878+01	-.1701878+01	-.1817174+01	-.1954285+01	-.2086814+01	-.2086814+01
500. -1000.	-.1628425+01	-.1628425+01	-.1741436+01	-.1954542+01	-.2031373+01	-.2031373+01

DISTANCE COEFFICIENT MATRIX

HEIGHT(M)	STABILITY 1	2	3	4	5	6
10. - 20.	.2900027-02	.2900027-02	.3338931-02	.4937388-02	.7684067-02	.7684067-02
20. - 30.	.3158612-02	.3158612-02	.3429267-02	.5028528-02	.6593149-02	.6593149-02
30. - 50.	.3197713-02	.3197713-02	.3611386-02	.4586086-02	.5143487-02	.5143487-02
50. - 70.	.3451263-02	.3451263-02	.3429790-02	.4385987-02	.3314044-02	.3314044-02
70. - 100.	.3619555-02	.3619555-02	.3357477-02	.3950618-02	.1967241-02	.1967241-02
100. - 200.	.4167720-02	.4167720-02	.3274807-02	.3243909-02	.6329087-03	.6329087-03
200. - 300.	.5046451-02	.5046451-02	.3155582-02	.2144561-02	.1914530-03	.1914530-03
300. - 500.	.6028864-02	.6028864-02	.3053716-02	.1221436-02	.1248309-03	.1248309-03
500. -1000.	.7752057-02	.7752057-02	.2981737-02	.3912975-03	.1133726-03	.1133726-03

DISTANCE EXPONENT MATRIX

HEIGHT(M)	STABILITY 1	2	3	4	5	6
10. - 20.	.9999975+00	.9999975+00	.1020462+01	.1014074+01	.1082892+01	.1082892+01
20. - 30.	.9714861+00	.9714861+00	.1011551+01	.1007968+01	.1134004+01	.1134004+01
30. - 50.	.9678687+00	.9678687+00	.9963369+00	.1035047+01	.1207008+01	.1207008+01
50. - 70.	.9483637+00	.9483637+00	.1009525+01	.1046451+01	.1319370+01	.1319370+01
70. - 100.	.9371571+00	.9371571+00	.1014541+01	.1071058+01	.1442128+01	.1442128+01
100. - 200.	.9065355+00	.9065355+00	.1019954+01	.1113856+01	.1688386+01	.1688386+01
200. - 300.	.8704266+00	.8704266+00	.1026954+01	.1191965+01	.1914059+01	.1914059+01
300. - 500.	.8392415+00	.8392415+00	.1032707+01	.1290655+01	.1989041+01	.1989041+01
500. -1000.	.7987884+00	.7987884+00	.1036545+01	.1473822+01	.2004533+01	.2004533+01

URBAN AREA SOURCES.

STAB = 1, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .48393932-01,DIST. OF MAX = .0410 KM.
STAB = 1, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .24197213-01,DIST. OF MAX = .0800 KM.
STAB = 1, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16131508-01,DIST. OF MAX = .1180 KM.
STAB = 1, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .96789353-02,DIST. OF MAX = .1910 KM.
STAB = 1, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .69135245-02,DIST. OF MAX = .2600 KM.
STAB = 1, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .48394614-02,DIST. OF MAX = .3580 KM.
STAB = 1, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .24197345-02,DIST. OF MAX = .6490 KM.
STAB = 1, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .16131557-02,DIST. OF MAX = .9060 KM.
STAB = 1, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .96769381-03,DIST. OF MAX = 1.3570 KM.
STAB = 1, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .48394689-03,DIST. OF MAX = 2.2950 KM.
STAB = 2, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .48393932-01,DIST. OF MAX = .0410 KM.
STAB = 2, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .24197213-01,DIST. OF MAX = .0800 KM.
STAB = 2, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16131508-01,DIST. OF MAX = .1180 KM.
STAB = 2, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .96789353-02,DIST. OF MAX = .1910 KM.
STAB = 2, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .69135245-02,DIST. OF MAX = .2600 KM.
STAB = 2, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .48394614-02,DIST. OF MAX = .3580 KM.
STAB = 2, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .24197345-02,DIST. OF MAX = .6490 KM.
STAB = 2, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .16131557-02,DIST. OF MAX = .9060 KM.
STAB = 2, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .96789381-03,DIST. OF MAX = 1.3570 KM.
STAB = 2, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .48394689-03,DIST. OF MAX = 2.2950 KM.
STAB = 3, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .48394691-01,DIST. OF MAX = .0500 KM.
STAB = 3, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .24197345-01,DIST. OF MAX = .1000 KM.
STAB = 3, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16131564-01,DIST. OF MAX = .1500 KM.
STAB = 3, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .96789391-02,DIST. OF MAX = .2500 KM.
STAB = 3, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .69135272-02,DIST. OF MAX = .3500 KM.
STAB = 3, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .48394690-02,DIST. OF MAX = .5000 KM.
STAB = 3, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .24197345-02,DIST. OF MAX = 1.0000 KM.
STAB = 3, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .16131563-02,DIST. OF MAX = 1.5000 KM.
STAB = 3, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .96789382-03,DIST. OF MAX = 2.5000 KM.
STAB = 3, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .48394690-03,DIST. OF MAX = 5.0000 KM.
STAB = 4, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .48394333-01,DIST. OF MAX = .0720 KM.
STAB = 4, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .24197343-01,DIST. OF MAX = .1460 KM.
STAB = 4, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16131538-01,DIST. OF MAX = .2210 KM.
STAB = 4, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .96789353-02,DIST. OF MAX = .3770 KM.
STAB = 4, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .69135270-02,DIST. OF MAX = .5390 KM.
STAB = 4, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .48394690-02,DIST. OF MAX = .7950 KM.
STAB = 4, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .24197345-02,DIST. OF MAX = 1.7670 KM.
STAB = 4, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .16131563-02,DIST. OF MAX = 2.9400 KM.
STAB = 4, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .96789381-03,DIST. OF MAX = 5.9660 KM.
STAB = 4, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .48394691-03,DIST. OF MAX = 18.1210 KM.
STAB = 5, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .48394538-01,DIST. OF MAX = .1370 KM.
STAB = 5, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .24197335-01,DIST. OF MAX = .3010 KM.
STAB = 5, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16131564-01,DIST. OF MAX = .4950 KM.
STAB = 5, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .96789390-02,DIST. OF MAX = .9830 KM.
STAB = 5, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .69135272-02,DIST. OF MAX = 1.6210 KM.
STAB = 5, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .48394690-02,DIST. OF MAX = 2.8850 KM.
STAB = 5, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .24197345-02,DIST. OF MAX = 9.9990 KM.
STAB = 5, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .16131564-02,DIST. OF MAX = 21.7380 KM.
STAB = 5, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .96789381-03,DIST. OF MAX = 59.2400 KM.
STAB = 5, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .48394690-03,DIST. OF MAX = 234.9900 KM.
STAB = 6, SOURCE HEIGHT = 10. METERS, REL. CONC. NORMALIZED FOR U = .48394538-01,DIST. OF MAX = .1370 KM.
STAB = 6, SOURCE HEIGHT = 20. METERS, REL. CONC. NORMALIZED FOR U = .24197335-01,DIST. OF MAX = .3010 KM.
STAB = 6, SOURCE HEIGHT = 30. METERS, REL. CONC. NORMALIZED FOR U = .16131564-01,DIST. OF MAX = .4950 KM.
STAB = 6, SOURCE HEIGHT = 50. METERS, REL. CONC. NORMALIZED FOR U = .96789390-02,DIST. OF MAX = .9830 KM.
STAB = 6, SOURCE HEIGHT = 70. METERS, REL. CONC. NORMALIZED FOR U = .69135272-02,DIST. OF MAX = 1.6210 KM.
STAB = 6, SOURCE HEIGHT = 100. METERS, REL. CONC. NORMALIZED FOR U = .48394690-02,DIST. OF MAX = 2.8850 KM.
STAB = 6, SOURCE HEIGHT = 200. METERS, REL. CONC. NORMALIZED FOR U = .24197345-02,DIST. OF MAX = 9.9990 KM.
STAB = 6, SOURCE HEIGHT = 300. METERS, REL. CONC. NORMALIZED FOR U = .16131564-02,DIST. OF MAX = 21.7380 KM.
STAB = 6, SOURCE HEIGHT = 500. METERS, REL. CONC. NORMALIZED FOR U = .96789381-03,DIST. OF MAX = 59.2400 KM.
STAB = 6, SOURCE HEIGHT = 1000. METERS, REL. CONC. NORMALIZED FOR U = .48394690-03,DIST. OF MAX = 234.9900 KM.

THESE COEFFICIENTS AND EXPONENTS WERE GENERATED USING THE URBAN DISPERSION SUBROUTINES.

AREA SOURCE
DISTANCE COEFFICIENT MATRIX

HEIGHT(M)	STABILITY 1	2	3	4	5	6
10. - 20.	.4450517-02	.4450517-02	.5000027-02	.6877562-02	.1002615-01	.1002615-01
20. - 30.	.4528886-02	.4528886-02	.5000015-02	.6825803-02	.7627630-02	.7627630-02
30. - 50.	.4778641-02	.4778641-02	.5000015-02	.6309888-02	.5138020-02	.5138020-02
50. - 70.	.5293828-02	.5293828-02	.5000010-02	.5906692-02	.2930329-02	.2930329-02
70. - 100.	.5759260-02	.5759260-02	.5000005-02	.5262648-02	.1688937-02	.1688937-02
100. - 200.	.6876471-02	.6876471-02	.5000004-02	.3942908-02	.7476889-03	.7476889-03
200. - 300.	.8298796-02	.8298796-02	.5000007-02	.2279950-02	.3916099-03	.3916099-03
300. - 500.	.9955613-02	.9955613-02	.4999999-02	.1088158-02	.2990024-03	.2990024-03
500. -1000.	.1220570-01	.1220570-01	.4999999-02	.2816450-03	.2553776-03	.2553776-03

DISTANCE EXPONENT MATRIX

HEIGHT(M)	STABILITY 1	2	3	4	5	6
10. - 20.	.9643744+00	.9643744+00	.9999986+00	.1019899+01	.1135587+01	.1135587+01
20. - 30.	.9585476+00	.9585476+00	.9999993+00	.1022420+01	.1226856+01	.1226856+01
30. - 50.	.9427646+00	.9427648+00	.9999993+00	.1045527+01	.1343024+01	.1343024+01
50. - 70.	.9165929+00	.9165929+00	.9999996+00	.1062407+01	.1486570+01	.1486570+01
70. - 100.	.8967562+00	.8967562+00	.9999998+00	.1089581+01	.1616266+01	.1616266+01
100. - 200.	.8582588+00	.8582588+00	.9999999+00	.1152275+01	.1793212+01	.1793212+01
200. - 300.	.8227749+00	.8227749+00	.9999998+00	.1255660+01	.1915274+01	.1915274+01
300. - 500.	.7908617+00	.7908617+00	.1000000+01	.1385340+01	.1962578+01	.1962578+01
500. -1000.	.7580733+00	.7580733+00	.1000000+01	.1602827+01	.1987956+01	.1987956+01

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C*** PROGRAM RAMBLK  -  VERSION 78124                                          BLK0010
C***THIS ROUTINE DETERMINES THE MAX. CONCENTRATION AND                         BLK0020
C***THE DISTANCE OF THE MAX .                                                  BLK0030
C***FOR POINT SOURCES, COEFFICIENTS   EXPONENTS ARE FOUND FOR BOTH             BLK0040
C***THE EQUATION FOR MAX. CONCENTRATION AND THE EQUATION FOR                   BLK0050
C***DISTANCE TO THE MAX. CONC.                                                 BLK0060
C***  X(MAX)=A*H**B                          CONC(MAX)=C*H**D                  BLK0070
C***FOR AREA SOURCES, COEFFICIENTS   EXPONENTS ARE FOUND ONLY FOR THE          BLK0080
C***EQUATION FOR DISTANCE TO THE MAX. CONC.                                    BLK0090
C***IN BOTH CASES THE COEFFICIENTS   EXPONENTS ARE FUNCTIONS OF                BLK0100
C***HEIGHT CLASS AND STABILITY                                                 BLK0110
      COMMON IMOD                                                              BLK0120
      DIMENSION H(10), XMAX(10), XUMAX(10), AXCOF(6,9), AXEXP(6,9), PXUC       BLK0130
     1OF(6,9), PXUEXP(6,9), PXCOF(6,9), PXEXP(6,9), TITLE(4,2), TYPE(2),       BLK0140
     2 SOURCE(2)                                                               BLK0150
      DATA TITLE /' PXCOF',' PXEXP','PXUCOF','PXUEXP',' AXCOF',' AXEXP',       BLK0160
     1'      ','      '/ ,SOURCE /' POINT',' AREA'/ ,TYPE /' RURAL',' U        BLK0170
     2RBAN'/                                                                   BLK0180
      DATA H /10.,20.,30.,50.,70.,100.,2 ).,300.,500.,1000./                   BLK0190
      DATA ZERO /'.00000'/ ,FIX /'+00'/                                        BLK0200
C***PUNCH HEADING AND COMMON                                                   BLK0210
      WRITE (1,270)                                                            BLK0220
C***INITIALIZATIONS***                                                         BLK0230
C                                                                              BLK0240
      IO=6                                                                     BLK0250
C***IMOD = 1 FOR RURAL SIGMAS, IMOD =2 FOR URBAN SIGMAS                        BLK0260
      READ (5,390) IMOD                                                        BLK0270
C***WHEN ITYPE = 1 POINT SOURCE COEFFICIENTS   EXPONENTS ARE CALCULATED        BLK0280
C*** WHEN ITYPE = 2 AREA SOURCE COEFFICIENTS   EXPONENTS ARE CALCULATED        BLK0290
      DO 260 ITYPE=1,2                                                         BLK0300
      WRITE (IO,280) TYPE(IMOD),SOURCE(ITYPE)                                  BLK0310
      Z=0.0                                                                    BLK0320
      HL=5000.                                                                 BLK0330
C                                                                              BLK0340
C***CALCULATIONS ARE PERFORMED FOR VARYING HEIGHTS AND STABILITY CLASSES       BLK0350
C                                                                              BLK0360
C***START LOOP FOR STABILITY.                                                  BLK0370
      DO 180 KST=1,6                                                           BLK0380
C***START LOOP FOR EFFECTIVE HEIGHTS.                                          BLK0390
      DO 140 IH=1,10                                                           BLK0400
      HT=H(IH)                                                                 BLK0410
      ICON=1                                                                   BLK0420
      XL=1.                                                                    BLK0430
C***START SEARCH FOR MAXIMUM AT 1 KILOMETER.                                   BLK0440
      X=XL                                                                     BLK0450
      XLIM=10.                                                                 BLK0460
      DELT=1.                                                                  BLK0470
C                                                                              BLK0480
C***THEN DETERMINE CONCENTRATION***                                            BLK0490
C                                                                              BLK0500
      IF (ITYPE.EQ.2) GO TO 10                                                 BLK0510
      CALL DETSCR (1.,Z,HT,HL,X,0.0,KST,SY,SIGZ,CL)                            BLK0520
      GO TO 20                                                                 BLK0530
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10    CALL JHHCZB (Z,HT,HL,X,KST,SIGZ,CL)                                    BLK0540
C***START OF FORWARD PROCEEDING LOOP.                                        BLK0550
20    GO TO (30,50), ICON                                                    BLK0560
C                                                                            BLK0570
C***IF DISTANCE LIMIT HAS BEEN EXCEEDED INCREASE LIMIT AND DELTA***          BLK0580
C                                                                            BLK0590
30    IF (XL-XLIM) 50,40,40                                                  BLK0600
C***RESET NEW LIMITING DISTANCE AND DISTANCE INCREMENT.                      BLK0610
40    XLIM=10.*XLIM                                                          BLK0620
      DELT=10.*DELT                                                          BLK0630
C                                                                            BLK0640
C***INCREMENT DISTANCE AND CALCULATE NEW CONCENTRATION***                    BLK0650
C                                                                            BLK0660
50    X=X+DELT                                                               BLK0670
      IF (ITYPE.EQ.2) GO TO 60                                               BLK0680
      CALL DBTRCB (1.,Z,HT,HL,X,0.0,KST,SY,SIGZ,C)                           BLK0690
      GO TO 70                                                               BLK0700
60    CALL JHHCZB (Z,HT,HL,X,KST,SIGZ,C)                                     BLK0710
C                                                                            BLK0720
C***CHECK TO SEE IF MAX CONC. HAS BEEN PASSED***                             BLK0730
C                                                                            BLK0740
70    IF (CL.GT.C) GO TO 80                                                  BLK0750
      CL=C                                                                   BLK0760
      XL=X                                                                   BLK0770
      IF (X.LE.1000.0) GO TO 20                                              BLK0780
C***ITERATION DID NOT CONVERGE WITHIN A REASONABLE DISTANCE                  BLK0790
      WRITE (IO,300) HT,KST,CL,XL                                            BLK0800
      GO TO 130                                                              BLK0810
C                                                                            BLK0820
C***MAX CONC. HAS BEEN PASSED, PROCEED BACK TO ISOLATE MAX***                BLK0830
C                                                                            BLK0840
80    IF (DELT.LE.0.001) GO TO 120                                           BLK0850
      DELT=.1*DELT                                                           BLK0860
90    CL=C                                                                   BLK0870
      XL=X                                                                   BLK0880
      X=X-DELT                                                               BLK0890
      IF (ITYPE.EQ.2) GO TO 100                                              BLK0900
      CALL DBTRCB (1.,Z,HT,HL,X,0.0,KST,SY,SIGZ,C)                           BLK0910
      GO TO 110                                                              BLK0920
100   CALL JHHCZB (Z,HT,HL,X,KST,SIGZ,C)                                     BLK0930
110   IF (C.GT.CL) GO TO 90                                                  BLK0940
C                                                                            BLK0950
C***MAX CONC. HAS BEEN PASSED AGAIN; PROCEED FORWARD IF DELT>1***            BLK0960
C                                                                            BLK0970
      IF (DELT.LE.0.001) GO TO 120                                           BLK0980
      CL=C                                                                   BLK0990
      XL=X                                                                   BLK1000
      DELT=.1*DELT                                                           BLK1010
C***ICON = 2 PREVENTS INCREASING DELT AND XLIM.                              BLK1020
      ICON=2                                                                 BLK1030
      GO TO 50                                                               BLK1040
C                                                                            BLK1050
C***MAX CONC. HAS BEEN FOUND; PRINT AND PUNCH RESULTS                        BLK1060
C***AND CONTINUE CALCULATIONS FOR VARYING HEIGHT AND STABILITY***            BLK1070
C                                                                            BLK1080
120   WRITE (IO,290) KST,HT,CL,XL                                            BLK1090
130   XUMAX(IH)=CL                                                           BLK1100
      XMAX(IH)=XL                                                            BLK1110
140   CONTINUE                                                               BLK1120
C***END OF EFFECTIVE HEIGHT LOOP                                             BLK1130
C***CALCULATE COEFFICIENTS   EXPONENTS FOR MAX. CONC.                        BLK1140
C***AND DISTANCE TO MAX. EQUATIONS                                           BLK1150
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      IF (ITYPE.EQ.2) GO TO 160                                          BLK1160
C***POINT SOURCE COEFFICIENTS AND EXPONENTS FOR ALL HEIGHT RANGES.       BLK1170
      DO 150 I=1,9                                                       BLK1180
      IP1=I+1                                                            BLK1190
      DENOM=ALOG(H(IP1))-ALOG(H(I))                                      BLK1200
      B=(ALOG(XMAX(IP1))-ALOG(XMAX(I)))/DENOM                            BLK1210
      PXEXP(KST,I)=B                                                     BLK1220
      PXCOF(KST,I)=XMAX(I)/H(I)**B                                       BLK1230
      B=(ALOG(XUMAX(IP1))-ALOG(XUMAX(I)))/DENOM                          BLK1240
      PXUEXP(KST,I)=B                                                    BLK1250
150   PXUCOF(KST,I)=XUMAX(I)/H(I)**B                                     BLK1260
      GO TO 180                                                          BLK1270
C***AREA SOURCE COEFFICIENTS AND EXPONENTS FOR ALL HEIGHT RANGES.        BLK1280
160   DO 170 I=1,9                                                       BLK1290
      IP1=I+1                                                            BLK1300
      DENOM=ALOG(H(IP1))-ALOG(H(I))                                      BLK1310
      B=(ALOG(XMAX(IP1))-ALOG(XMAX(I)))/DENOM                            BLK1320
      AXEXP(KST,I)=B                                                     BLK1330
170   AXCOF(KST,I)=XMAX(I)/H(I)**B                                       BLK1340
C***END STABILITY LOOP.                                                  BLK1350
180   CONTINUE                                                           BLK1360
      WRITE (IO,400) TYPE(IMOD)                                          BLK1370
      IF (ITYPE.EQ.2) GO TO 230                                          BLK1380
C***PRINT COEFFICIENTS AND EXPONENTS FOR POINT SOURCES                   BLK1390
      WRITE (IO,300) (I,I=1,6)                                           BLK1400
      DO 190 I=1,9                                                       BLK1410
      IP1=I+1                                                            BLK1420
      WRITE (IO,310) H(I),H(IP1),(PXUCOF(J,I),J=1,6)                     BLK1430
190   CONTINUE                                                           BLK1440
      WRITE (IO,320) (I,I=1,6)                                           BLK1450
      DO 200 I=1,9                                                       BLK1460
      IP1=I+1                                                            BLK1470
      WRITE (IO,310) H(I),H(IP1),(PXUEXP(J,I),J=1,6)                     BLK1480
200   CONTINUE                                                           BLK1490
      WRITE (IO,330) (I,I=1,6)                                           BLK1500
      DO 210 I=1,9                                                       BLK1510
      IP1=I+1                                                            BLK1520
      WRITE (IO,310) H(I),H(IP1),(PXCOF(J,I),J=1,6)                      BLK1530
210   CONTINUE                                                           BLK1540
      WRITE (IO,340) (I,I=1,6)                                           BLK1550
      DO 220 I=1,9                                                       BLK1560
      IP1=I+1                                                            BLK1570
      WRITE (IO,310) H(I),H(IP1),(PXEXP(J,I),J=1,6)                      BLK1580
220   CONTINUE                                                           BLK1590
C                                                                        BLK1600
C***PUNCH BLOCK DATA ROUTINE                                             BLK1610
C                                                                        BLK1620
      CALL PUNCH (1,PXCOF)                                               BLK1630
      CALL PUNCH (2,PXEXP)                                               BLK1640
      CALL PUNCH (3,PXUCOF)                                              BLK1650
      CALL PUNCH (4,PXUEXP)                                              BLK1660
      GO TO 260                                                          BLK1670
C***PRINT COEFFICIENTS  AND EXPONENTS FOR AREA SOURCES                   BLK1680
230   WRITE (IO,350) (I,I=1,6)                                           BLK1690
      DO 240 I=1,9                                                       BLK1700
      IP1=I+1                                                            BLK1710
      WRITE (IO,310) H(I),H(IP1),(AXCOF(J,I),J=1,6)                      BLK1720
240   CONTINUE                                                           BLK1730
      WRITE (IO,360) (I,I=1,6)                                           BLK1740
      DO 250 I=1,9                                                       BLK1750
      IP1=I+1                                                            BLK1760
      WRITE (IO,310) H(I),H(IP1).(AXEXP(J,I),J=1,6)                      BLK1770
```

```
250   CONTINUE                                                          BLK1780
      CALL PUNCH (1,AXCOF)                                              BLK1790
      CALL PUNCH (2,AXEXP)                                              BLK1800
260   CONTINUE                                                          BLK1810
C***END OF SOURCE TYPE LOOP.                                            BLK1820
      WRITE (1,370) H                                                   BLK1830
      CALL EXIT                                                         BLK1840
C                                                                       BLK1850
270   FORMAT (6X,'BLOCK DATA'/6X,'COMMON /COEFFS/ PXCOF(6,9),PXEXP(6,9), BLK1860
     1','PXUCOF(6,9),PXUEXP(6,9),'/5X,'*AXCOF(6,9),AXEXP(6,9),HC1(10)') BLK1870
280   FORMAT ('1',2A6,' SOURCES.'//)                                    BLK1880
290   FORMAT (' STAB =',I2,', SOURCE HEIGHT =',F6.0,' METERS, REL. CONC. BLK1890
     1 NORMALIZED FOR U =',E16.8,',DIST. OF MAX =',F10.4,' KM.')       BLK1900
300   FORMAT (' ',T54,'POINT SOURCE'/1X,T45,'CONCENTRATION COEFFICIENT M BLK1910
     1ATRIX'//1X,'HEIGHT(M)',T57,'STABILITY'/1X,T29,6(I1,16X))         BLK1920
310   FORMAT (4X,F4.0,' -',F5.0,4X,6E16.7)                              BLK1930
320   FORMAT ('0',T45,'CONCENTRATION EXPONENT MATRIX'//1X,'HEIGHT(M)',T5 BLK1940
     17,'STABILITY'/1X,T29,6(I1,16X))                                   BLK1950
330   FORMAT ('0',T45,'DISTANCE COEFFICIENT MATRIX'//1X,'HEIGHT(M)',T57, BLK1960
     1'STABILITY'/1X,T29,6(I1,16X))                                     BLK1970
340   FORMAT ('0',T45,'DISTANCE EXPONENT MATRIX'//1X,'HEIGHT(M)',T57,'ST BLK1980
     1ABILITY'/1X,T29,6(I1,16X))                                        BLK1990
350   FORMAT (' ',T54,'AREA SOURCE'/1X,T45,'DISTANCE COEFFICIENT MATRIX' BLK2000
     1//1X,'HEIGHT(M)',T57,'STABILITY'/1X,T29,6(I1,16X))                BLK2010
360   FORMAT ('0',T45,'DISTANCE EXPONENT MATRIX'//1X,'HEIGHT(M)',T57,'ST BLK2020
     1ABILITY'/1X,T29,6(I1,16X))                                        BLK2030
370   FORMAT (6X,'DATA HC1/',5(F3.0,','),4(F4.0,','),F5.0,'/'/6X,'END') BLK2040
380   FORMAT (' ITERATION DID NOT CONVERGE BEFORE A DISTANCE OF 1000KM. BLK2050
     1 THE NEXT CONCENTRATION BEYOND 1000. KM IS SUBSTITUTED FOR THE  HA BLK2060
     2X.'/22X,'HEIGHT=',F6.0,2X,'STAB=',I2,2X,'CL=',E16.8,2X,'XL=',F10.4 BLK2070
     3//)                                                               BLK2080
390   FORMAT (I1)                                                       BLK2090
400   FORMAT ('1',10X,'THESE COEFFICIENTS AND EXPONENTS WERE GENERATED  BLK2100
     1 USING THE',A6,' DISPERSION SUBROUTINES.'///1X)                   BLK2110
C                                                                       BLK2120
      SUBROUTINE PUNCH (IQ,DATA)                                        BLK2130
C***THE SOLE PURPOSE OF THIS SUBROUTINE IS TO PUNCH A DATA CARD WHICH   BLK2131
C***CAN BE READ BACK BY THE MACHINE. ON MOST MACHINES THIS SUBROUTINE   BLK2132
C***CAN BE REPLACED BY A SERIES OF PUNCH OR WRITE STATEMENTS.           BLK2132
      DIMENSION DATA(54), VAL(12), CARD(12)                             BLK2140
      ENCODE (69,50,VAL,IT) TITLE(IQ,ITYPE),(DATA(I),I=1,4)             BLK2150
      DECODE (69,60,VAL,IT) CARD                                        BLK2160
      DO 10 I=5,11,2                                                    BLK2170
      IF (CARD(I).EQ.ZERO) FLD(0,18,CARD(I+1))=FLD(0,18,FIX)            BLK2180
10    CONTINUE                                                          BLK2190
      WRITE (1,70) CARD                                                 BLK2200
      DO 30 IB=5,49,5                                                   BLK2210
      IE=IB+4                                                           BLK2220
      ENCODE (68,80,VAL,IT) (DATA(I),I=IB,IE)                           BLK2230
      DECODE (68,90,VAL,IT) CARD                                        BLK2240
      DO 20 I=3,11,2                                                    BLK2250
      IF (CARD(I).EQ.ZERO) FLD(0,18,CARD(I+1))=FLD(0,18,FIX)            BLK2260
20    CONTINUE                                                          BLK2270
      WRITE (1,100) CARD                                                BLK2280
30    CONTINUE                                                          BLK2290
      ENCODE (68,110,VAL,IT) (DATA(I),I=50,54)                          BLK2300
      DECODE (68,90,VAL,IT) CARD                                        BLK2310
      DO 40 I=3,11,2                                                    BLK2320
      IF (CARD(I).EQ.ZERO) FLD(0,18,CARD(I+1))=FLD(0,18,FIX)            BLK2330
40    CONTINUE                                                          BLK2340
      WRITE (1,190) CARD                                                BLK2350
      RETURN                                                            BLK2360
```

```
C                                                                       BLK2370
50    FORMAT (12H      DATA  ,A6,1H/,4(E11.5,1H,),2H  )                 BLK2380
60    FORMAT (3A6,A3,8A6)                                               BLK2390
70    FORMAT (3A6,A3,4(A6,1HE,A6))                                      BLK2400
80    FORMAT (6H      *,5(E11.5,1H,),2H  )                              BLK2410
90    FORMAT (A6,A2,10A6)                                               BLK2420
100   FORMAT (A6,A2,5(A6,1HE,A6))                                       BLK2430
110   FORMAT (6H      *,4(E11.5,1H,),E11.5,3H/  )                       BLK2440
C                                                                       BLK2450
      END                                                               BLK2460



      SUBROUTINE JMHCZB (Z,H,HL,X,KST,SZ,RCZ)                           CZB0010
C        SUBROUTINE JMHCZB CALCULATES CHI*U/Q, RELATIVE CONCENTRATION   CZB0020
      COMMON IMOD                                                       CZB0030
C         NORMALIZED FOR WIND SPEED AND EMISSION RATE, FOR A CROSSWIND  CZB0040
C         INFINTE SOURCE UPWIND OF A RECEPTOR (IN UNITS OF: PER METER)  CZB0050
C        JMHCZB CALLS SUBROUTINE PGSZ OR BRSZ, DEPENDING ON THE VALUES  CZB0060
C        OF IMOD. IMOD=1 CALLS PGSZ,  IMOD=2 CALLS BRSZ                 CZB0070
C        THE INPUT VARIABLES ARE....                                    CZB0080
C         Z    RECEPTOR HEIGHT (M)                                     CZB0090
C         H    EFFECTIVE STACK HEIGHT (M)                              CZB0100
C         HL   MIXING HEIGHT- TOP OF NEUTRAL OR UNSTABLE LAYER(M)      CZB0110
C         X    DISTANCE  SOURCE IS UPWIND OF RECEPTOR (KM)             CZB0120
C         KST  STABILITY CLASS                                         CZB0130
C        THE OUTPUT VARIABLES ARE....                                   CZB0140
C        SZ    VERTICAL DISPERSION PARAMTER.                           CZB0150
C        RCZ   RELATIVE CONCENTRATION HAS UNITS OF: PER METER.         CZB0160
C     THE FOLLOWING EQUATION IS SOLVED --                              CZB0170
C        RC = (1/2.5066 *SIGMA Z) * ((EXP(-.05*((Z-H)/SIGMA Z)**2)     CZB0180
C             + (EXP(-0.5*((Z+H)/SIGMA Z)**2))                         CZB0190
C             PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (N=1,K) --  CZB0200
C               FOR NEUTRAL OR UNSTABLE CASES:                         CZB0210
C              TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)                CZB0220
C              TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)                CZB0230
C              TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)                CZB0240
C              TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)                CZB0250
C        2.5066 IS THE SQUARE ROOT OF 2 * PI                            CZB0260
C***NOTE THAT MIXING HEIGHT- THE TOP OF THE NEUTRAL OR UNSTABLE LAYER-  CZB0270
C***HAS A VALUE ONLY FOR STABILITIES 1-4, THAT IS, MIXING HEIGHT        CZB0280
C***DOES NOT EXIST FOR STABLE LAYERS AT THE GROUND SURFACE- STABILITY    CZB0290
C***5 OR 6.                                                             CZB0300
C        STATEMENTS 190 TO 330 CALCULATE RC, THE RELATIVE CONCENTRATION, CZB0310
C         USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE     CZB0320
C         VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.           CZB0330
C         CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE           CZB0340
C         EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN   CZB0350
C         -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS   CZB0360
C         PRINTED INFORMING OF THIS.                                    CZB0370
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.     CZB0380
C        IWRI IS CONTROL CODE FOR OUTPUT                                CZB0390
      IWRI=6                                                            CZB0400
C***IF STABLE, SKIP CONSIDERATION OF MIXING HEIGHT.                     CZB0410
      IF (KST.GE.5) GO TO 40                                            CZB0420
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0., AND RETURN.       CZB0430
      IF (H-HL) 10,10,20                                                CZB0440
10    IF (Z-HL) 40,40,180                                               CZB0450
20    IF (Z-HL) 180,30,30                                               CZB0460
30    WRITE (IWRI,430)                                                  CZB0470
      RETURN                                                            CZB0480
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C         IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS   CZB0490
C          PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                  CZB0500
40    IF (X-0.001) 180,50,50                                             CZB0510
50    IF (IMOD.EQ.1) CALL PGSZ (X,KST,SZ)                                CZB0520
      IF (IMOD.EQ.2) CALL BRSZ (X,KST,SZ)                                CZB0530
C          SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE   CZB0540
C          Z-DIRECTION (M)                                               CZB0550
      IF (KST-4) 60,60,70                                                CZB0560
60    IF (HL-5000.) 150,70,70                                            CZB0570
C         IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT:                 CZB0580
70    C2=2.*SZ*SZ                                                        CZB0590
      IF (Z) 180,80,100                                                  CZB0600
C***FOR Z = ZERO:                                                        CZB0610
80    C3=H*H/C2                                                          CZB0620
      IF (C3-50.) 90,180,180                                             CZB0630
90    A2=2./EXP(C3)                                                      CZB0640
      RCZ=A2/(2.5066*SZ)                                                 CZB0650
      RETURN                                                             CZB0660
C***FOR NON-ZERO Z:                                                      CZB0670
100   A2=0.                                                              CZB0680
      A3=0.                                                              CZB0690
      CA=Z-H                                                             CZB0700
      CB=Z+H                                                             CZB0710
      C3=CA*CA/C2                                                        CZB0720
      C4=CB*CB/C2                                                        CZB0730
      IF (C3-50.) 110,120,120                                            CZB0740
110   A2=1./EXP(C3)                                                      CZB0750
120   IF (C4-50.) 130,140,140                                            CZB0760
130   A3=1./EXP(C4)                                                      CZB0770
140   RCZ=(A2+A3)/(2.5066*SZ)                                            CZB0780
      RETURN                                                             CZB0790
C         IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,        CZB0800
C          THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH      CZB0810
C          HEIGHT REGARDLESS OF SOURCE HEIGHT.                           CZB0820
150   IF (SZ/HL-1.6) 170,170,160                                         CZB0830
160   RCZ=1./HL                                                          CZB0840
      RETURN                                                             CZB0850
C         INITIAL VALUE OF AN SET = 0.                                   CZB0860
C          AN   THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED      CZB0870
C           AND ADDED IN.                                                CZB0880
170   AN=0.                                                              CZB0890
      IF (Z) 180,340,190                                                 CZB0900
C***NOTE: AN ERRONEOUS NEGATIVE Z WILL RESULT IN ZERO CONCENTRATIONS.    CZB0910
180   RCZ=0.                                                             CZB0920
      RETURN                                                             CZB0930
C***CALCULATE MULTIPLE EDDY REFLECTIONS FOR ELEVATED RECEPTOR HEIGHT.    CZB0940
190   A1=1./(2.5066*SZ)                                                  CZB0950
      C2=2.*SZ*SZ                                                        CZB0960
      A2=0.                                                              CZB0970
      A3=0.                                                              CZB0980
      CA=Z-H                                                             CZB0990
      CB=Z+H                                                             CZB1000
      C3=CA*CA/C2                                                        CZB1010
      C4=CB*CB/C2                                                        CZB1020
      IF (C3-50.) 200,210,210                                            CZB1030
200   A2=1./EXP(C3)                                                      CZB1040
210   IF (C4-50.) 220,230,230                                            CZB1050
220   A3=1./EXP(C4)                                                      CZB1060
230   SUM=0.                                                             CZB1070
      THL=2.*HL                                                          CZB1080
240   AN=AN+1.                                                           CZB1090
      A4=0.                                                              CZB1100
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      A5=0.                                                              CZB1110
      A6=0.                                                              CZB1120
      A7=0.                                                              CZB1130
      C5=AN*THL                                                          CZB1140
      CC=CA-C5                                                           CZB1150
      CD=CB-C5                                                           CZB1160
      CE=CA+C5                                                           CZB1170
      CF=CB+C5                                                           CZB1180
      C6=CC*CC/C2                                                        CZB1190
      C7=CD*CD/C2                                                        CZB1200
      C8=CE*CE/C2                                                        CZB1210
      C9=CF*CF/C2                                                        CZB1220
      IF (C6-50.) 250,260,260                                            CZB1230
250   A4=1./EXP(C6)                                                      CZB1240
260   IF (C7-50.) 270,280,280                                            CZB1250
270   A5=1./EXP(C7)                                                      CZB1260
280   IF (C8-50.) 290,300,300                                            CZB1270
290   A6=1./EXP(C8)                                                      CZB1280
300   IF (C9-50.) 310,320,320                                            CZB1290
310   A7=1./EXP(C9)                                                      CZB1300
320   T=A4+A5+A6+A7                                                      CZB1310
      SUM=SUM+T                                                          CZB1320
      IF (T-0.01) 330,240,240                                            CZB1330
330   RCZ=A1*(A2+A3+SUM)                                                 CZB1340
      RETURN                                                             CZB1350
C CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR HEIGHT   CZB1360
340   A1=1./(2.5066*SZ)                                                  CZB1370
      A2=0.                                                              CZB1380
      C2=2.*SZ*SZ                                                        CZB1390
      C3=H*H/C2                                                          CZB1400
      IF (C3-50.) 350,360,360                                            CZB1410
350   A2=2./EXP(C3)                                                      CZB1420
360   SUM=0.                                                             CZB1430
      THL=2.*HL                                                          CZB1440
370   AN=AN+1.                                                           CZB1450
      A4=0.                                                              CZB1460
      A6=0.                                                              CZB1470
      C5=AN*THL                                                          CZB1480
      CC=H-C5                                                            CZB1490
      CE=H+C5                                                            CZB1500
      C6=CC*CC/C2                                                        CZB1510
      C8=CE*CE/C2                                                        CZB1520
      IF (C6-50.) 380,390,390                                            CZB1530
380   A4=2./EXP(C6)                                                      CZB1540
390   IF (C8-50.) 400,410,410                                            CZB1550
400   A6=2./EXP(C8)                                                      CZB1560
410   T=A4+A6                                                            CZB1570
      SUM=SUM+T                                                          CZB1580
      IF (T-0.01) 420,370,370                                            CZB1590
420   RCZ=A1*(A2+SUM)                                                    CZB1600
      RETURN                                                             CZB1610
C                                                                        CZB1620
430   FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABL CZB1630
     1E COMPUTATION CAN NOT BE MADE.')                                   CZB1640
C                                                                        CZB1650
      END                                                                CZB1660


      SUBROUTINE OBTRCE (U,Z,H,HL,X,Y,RST,SY,SZ,RC)                      RCB0010
      COMMON IMOD                                                        RCB0020
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C       DETERMINE RELATIVE CONCENTRATION FROM POINT SOURCES.                    RCB0030
C         SUBROUTINE DETRCR CALCULATES CHI/Q CONCENTRATION VALUES, DETRCR       RCB0040
C          CALLS UPON  PGSYSZ OR BRSYSZ TO OBTAIN STANDARD DEVIATIONS,          RCB0050
C          DEPENDING ON VALUES OF IMOD.                                         RCB0060
C            IMOD=1 CALLS PGSYSZ                                                RCB0070
C            IMOD=2 CALLS BRSYSZ                                                RCB0080
C         THE INPUT VARIABLES ARE....                                           RCB0090
C          U     WIND SPEED (M/SEC)                                             RCB0100
C          Z     RECEPTOR HEIGHT (M)                                            RCB0110
C          H     EFFECTIVE STACK HEIGHT (M)                                     RCB0120
C          HL    MIXING HEIGHT- TOP OF NEUTRAL OR UNSTABLE LAYER(M).            RCB0130
C          X     DISTANCE RECEPTOR IS DOWNWIND OF SOURCE (KM)                   RCB0140
C          Y     DISTANCE RECEPTOR IS CROSSWIND FROM SOURCE (KM)                RCB0150
C          KST   STABILITY CLASS                                                RCB0160
C         THE OUTPUT VARIABLES ARE....                                          RCB0170
C           SY HORIZONTAL DISPERSION PARAMETER                                  RCB0180
C           SZ VERTICAL DISPERSION PARAMETER                                    RCB0190
C          RC   RELATIVE CONCENTRATION (SEC/M**3) ,CHI/Q                        RCB0200
C         IWRI IS CONTROL CODE FOR WARNING OUTPUT.                              RCB0210
      IWRI=6                                                                    RCB0220
C         THE FOLLOWING EQUATION IS SOLVED --                                   RCB0230
C           RC = (1/(2*PI*U*SIGMA Y*SIGMA Z))* (EXP(-0.5*(Y/SIGMA Y)**2))       RCB0240
C            (EXP(-0.5*((Z-H)/SIGMA Z)**2) + EXP(-0.5*((Z+H)/SIGMA Z)**2)       RCB0250
C              PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (K=1,K) --         RCB0260
C                   FOR NEUTRAL OR UNSTABLE CASES:                              RCB0270
C               TERM 1- EXP(-0.5*((Z-H-2KL)/SIGMA Z)**2)                        RCB0280
C               TERM 2- EXP(-0.5*((Z+H-2KL)/SIGMA Z)**2)                        RCB0290
C               TERM 3- EXP(-0.5*((Z-H+2KL)/SIGMA Z)**2)                        RCB0300
C               TERM 4- EXP(-0.5*((Z+H+2KL)/SIGMA Z)**2)                        RCB0310
C NOTE THAT MIXING HEIGHT- THE TOP OF THE NEUTRAL OR UNSTABLE LAYER-            RCB0320
C HAS A VALUE ONLY FOR STABILITIES 1-4, THAT IS, MIXING HEIGHT DOES             RCB0330
C NOT EXIST FOR STABLE LAYERS AT THE GROUND SURFACE- STABILITY 5 OR 6.          RCB0340
C         THE ABOVE EQUATION IS SIMILAR TO EQUATION (5.6) P 36 IN               RCB0350
C          WORKBOOK OF ATMOSPHERIC DISPERSION ESTIMATES WITH THE ADDITION        RCB0360
C          OF THE EXPONENTIAL INVOLVING Y.                                      RCB0370
C***IF STABLE, SKIP CONSIDERATION OF MIXING HEIGHT.                             RCB0380
      IF (KST.GE.5) GO TO 50                                                    RCB0390
C         IF THE SOURCE IS ABOVE THE LID, SET RC = 0., AND RETURN.              RCB0400
      IF (H-HL) 10,10,20                                                        RCB0410
10    IF (Z-HL) 50,50,40                                                        RCB0420
20    IF (Z-HL) 40,30,30                                                        RCB0430
30    WRITE (IWRI,460)                                                          RCB0440
40    RC=0.                                                                     RCB0450
      RETURN                                                                    RCB0460
C         IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS         RCB0470
C          PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                        RCB0480
50    IF (X-0.001) 40,60,60                                                     RCB0490
C         CALL PGSYSZ OR BRSYSZ TO OBTAIN VALUES FOR SY AND SZ                  RCB0500
60    IF (IMOD.EQ.1) CALL PGSYSZ (X,KST,SY,SZ)                                  RCB0510
      IF (IMOD.EQ.2) CALL BRSYSZ (X,KST,SY,SZ)                                  RCB0520
C           SY = SIGMA Y, THE STANDARD DEVIATION OF CONCENTRATION IN THE        RCB0530
C           Y-DIRECTION (M)                                                     RCB0540
C           SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE        RCB0550
C           Z-DIRECTION (M)                                                     RCB0560
      C1=1.                                                                     RCB0570
      IF (Y) 70,90,70                                                           RCB0580
70    YD=1000.*Y                                                                RCB0590
C         YD IS CROSSWIND DISTANCE IN METERS.                                   RCB0600
      DUM=YD/SY                                                                 RCB0610
      TEMP=0.5*DUM*DUM                                                          RCB0620
      IF (TEMP-50.) 80,40,40                                                    RCB0630
80    C1=EXP(TEMP)                                                              RCB0640
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 90    IF (KST-4) 100,100,110                                                  RCB0650
100    IF (HL-5000.) 190,110,110                                               RCB0660
C         IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT,                      RCB0670
C          USE EQUATION 3.2 IF Z = 0, OR EQ 3.1 FOR NON-ZERO Z.                RCB0680
C          (EQUATION NUMBERS REFER TO WORKBOOK OF ATMOSPHERIC DISPERSION       RCB0690
C          ESTIMATES.)                                                         RCB0700
110    C2=2.*SZ*SZ                                                             RCB0710
       IF (Z) 40,120,140                                                       RCB0720
C        NOTE: AN ERRONEOUS NEGATIVE Z WILL RESULT IN ZERO CONCENTRATIONS      RCB0730
120    C3=H*H/C2                                                               RCB0740
       IF (C3-50.) 130,40,40                                                   RCB0750
130    A2=1./EXP(C3)                                                           RCB0760
C         WADE EQUATION 3.2.                                                   RCB0770
       RC=A2/(3.14159*U*SY*SZ*C1)                                              RCB0780
       RETURN                                                                  RCB0790
140    A2=0.                                                                   RCB0800
       A3=0.                                                                   RCB0810
       CA=Z-H                                                                  RCB0820
       CB=Z+H                                                                  RCB0830
       C3=CA*CA/C2                                                             RCB0340
       C4=CB*CB/C2                                                             RCB0850
       IF (C3-50.) 150,160,160                                                 RCB0860
150    A2=1./EXP(C3)                                                           RCB0870
160    IF (C4-50.) 170,130,180                                                 RCB0880
170    A3=1./EXP(C4)                                                           RCB0390
C         WADE EQUATION 3.1.                                                   RCB0900
180    RC=(A2+A3)/(6.28318*U*SY*SZ*C1)                                         RCB0910
       RETURN                                                                  RCB0920
C         IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,              RCB0930
C          THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH            RCB0940
C          HEIGHT REGARDLESS OF SOURCE HEIGHT BECAUSE OF REPEATED EDDY         RCB0950
C          REFLECTIONS FROM THE GROUND AND THE MIXING HEIGHT.                  RCB0960
190    IF (SZ/HL-1.6) 210,210,200                                              RCB0970
C         WADE EQUATION 3.5.                                                   RCB0980
200    RC=1./(2.5066*U*SY*HL*C1)                                               RCB0990
       RETURN                                                                  RCB1000
C         INITIAL VALUE OF AN SET = 0.                                         RCB1010
C          AN - THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED            RCB1020
C               AND ADDED IN.                                                  RCB1030
210    AN=0.                                                                   RCB1040
       IF (Z) 40,370,220                                                       RCB1050
C       STATEMENTS 220-260 CALCULATE RC, THE RELATIVE CONCENTRATION,           RCB1060
C          USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE           RCB1070
C          VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.                 RCB1080
C          CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE                 RCB1090
C          EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN         RCB1100
C          -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS         RCB1110
C          PRINTED INFORMING OF THIS.                                          RCB1120
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.            RCB1130
220    A1=1./(6.28318*U*SY*SZ*C1)                                              RCB1140
       C2=2.*SZ*SZ                                                             RCB1150
       A2=0.                                                                   RCB1160
       A3=0.                                                                   RCB1170
       CA=Z-H                                                                  RCB1180
       CB=Z+H                                                                  RCB1190
       C3=CA*CA/C2                                                             RCB1200
       C4=CB*CB/C2                                                             RCB1210
       IF (C3-50.) 230,240,240                                                 RCB1220
230    A2=1./EXP(C3)                                                           RCB1230
240    IF (C4-50.) 250,260,260                                                 RCB1240
250    A3=1./EXP(C4)                                                           RCB1250
260    SUM=0.                                                                  RCB1260
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      THL=2.*HL                                                          RCB1270
270   AN=AN+1.                                                           RCB1280
      A4=0.                                                              RCB1290
      A5=0.                                                              RCB1300
      A6=0.                                                              RCB1310
      A7=0.                                                              RCB1320
      C5=AN*THL                                                          RCB1330
      CC=CA-C5                                                           RCB1340
      CD=CB-C5                                                           RCB1350
      CE=CA+C5                                                           RCB1360
      CF=CB+C5                                                           RCB1370
      C6=CC*CC/C2                                                        RCB1380
      C7=CD*CD/C2                                                        RCB1390
      C8=CE*CE/C2                                                        RCB1400
      C9=CF*CF/C2                                                        RCB1410
      IF (C6-50.) 280,290,290                                            RCB1420
280   A4=1./EXP(C6)                                                      RCB1430
290   IF (C7-50.) 300,310,310                                            RCB1440
300   A5=1./EXP(C7)                                                      RCB1450
310   IF (C8-50.) 320,330,330                                            RCB1460
320   A6=1./EXP(C8)                                                      RCB1470
330   IF (C9-50.) 340,350,350                                            RCB1480
340   A7=1./EXP(C9)                                                      RCB1490
350   T=A4+A5+A6+A7                                                      RCB1500
      SUM=SUM+T                                                          RCB1510
      IF (T-0.01) 360,270,270                                            RCB1520
360   RC=A1*(A2+A3+SUM)                                                  RCB1530
      RETURN                                                             RCB1540
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR   RCB1550
C        HEIGHT.                                                         RCB1560
370   A1=1./(6.28318*U*SY*SZ*C1)                                         RCB1570
      A2=0.                                                              RCB1580
      C2=2.*SZ*SZ                                                        RCB1590
      C3=H*H/C2                                                          RCB1600
      IF (C3-50.) 380,390,390                                            RCB1610
380   A2=2./EXP(C3)                                                      RCB1620
390   SUM=0.                                                             RCB1630
      THL=2.*HL                                                          RCB1640
400   AN=AN+1.                                                           RCB1650
      A4=0.                                                              RCB1660
      A6=0.                                                              RCB1670
      C5=AN*THL                                                          RCB1680
      CC=H-C5                                                            RCB1690
      CE=H+C5                                                            RCB1700
      C6=CC*CC/C2                                                        RCB1710
      C8=CE*CE/C2                                                        RCB1720
      IF (C6-50.) 410,420,420                                            RCB1730
410   A4=2./EXP(C6)                                                      RCB1740
420   IF (C8-50.) 430,440,440                                            RCB1750
430   A6=2./EXP(C8)                                                      RCB1760
440   T=A4+A6                                                            RCB1770
      SUM=SUM+T                                                          RCB1780
      IF (T-0.01) 450,400,400                                            RCB1790
450   RC=A1*(A2+SUM)                                                     RCB1800
      RETURN                                                             RCB1810
C                                                                        RCB1820
460   FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABL RCB1830
     1E COMPUTATION CAN NOT BE MADE.')                                   RCB1840
C                                                                        RCB1850
      END                                                                RCB1860
```

Date_____

Chief, Environmental Applications Branch

Meteorology and Assessment Division (MD-80)

U.S. Environmental Protection Agency

RESRCH TRI PK, NC 27711

I would like to receive future revisions to the *User's Guide For RAM, Vol. II.*

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